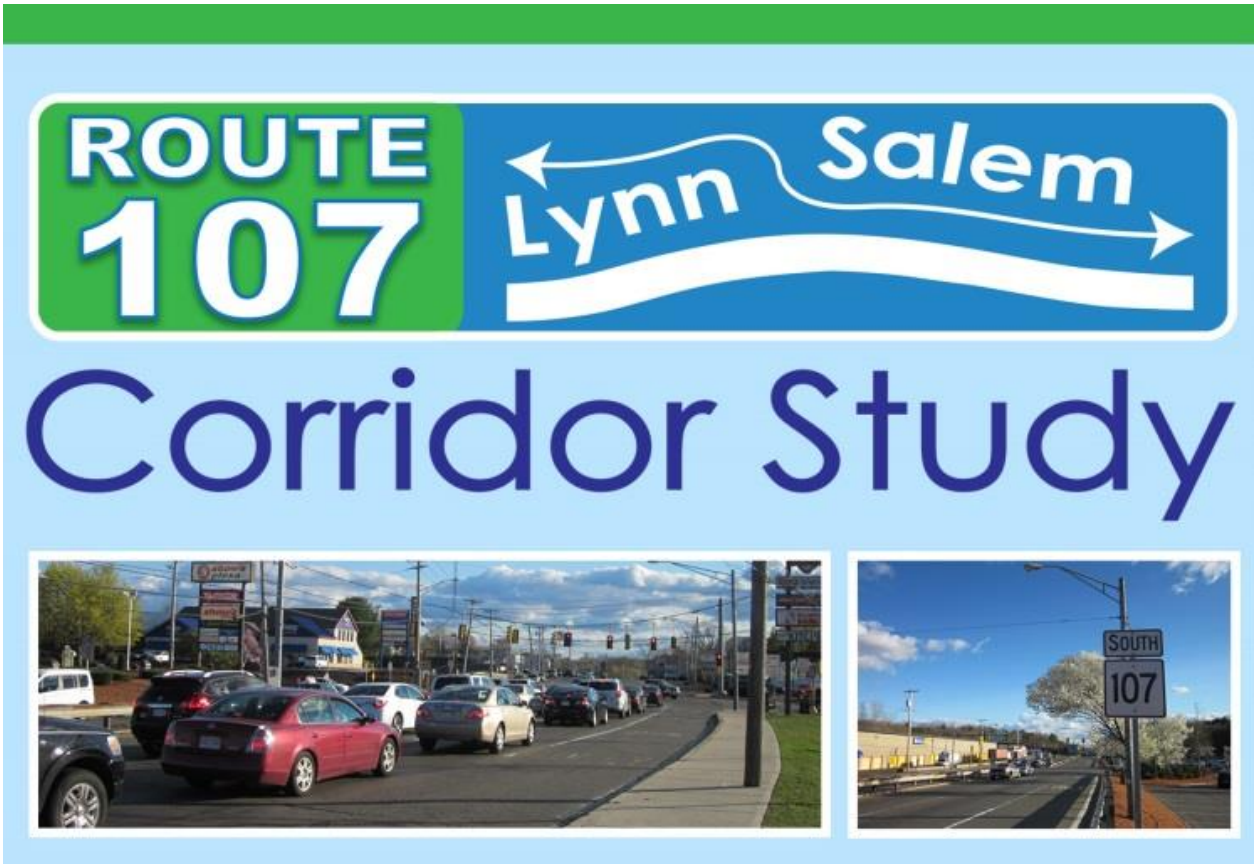
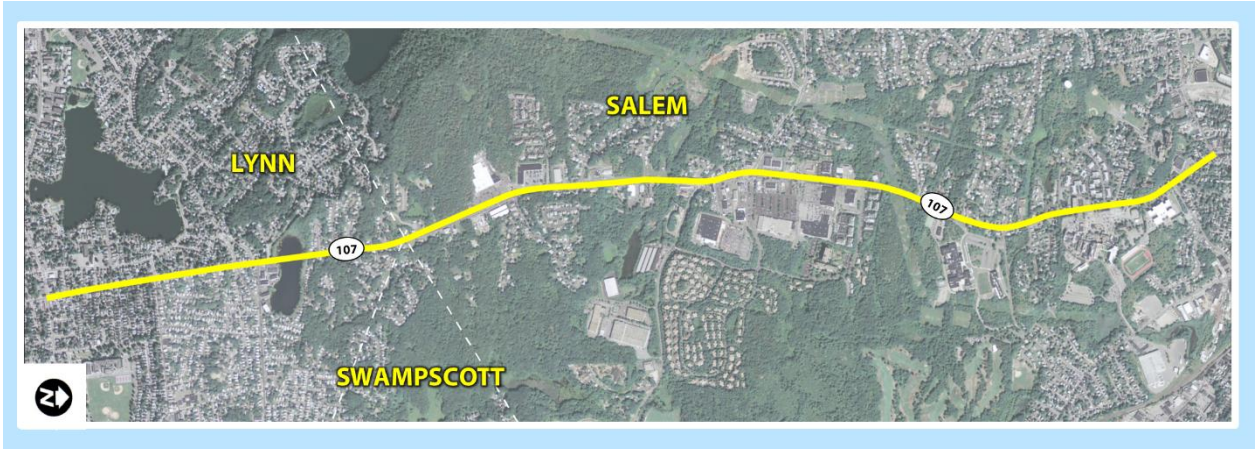


Route 107 Corridor Study:

Analysis and Multimodal Design of Recommendations Along Route 107 in Salem and Lynn, MA

FINAL REPORT **November 2016**



massDOT | **McMahon Associates** | Regina Villa Associates

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EXECUTIVE SUMMARY

The Massachusetts Department of Transportation (MassDOT) initiated the Route 107 Corridor Study to evaluate existing transportation conditions along the corridor, assess the potential of future development and economic growth in the corridor, and to develop both short term and long-term improvements for all modes of travel. The study corridor runs between Chestnut Street in Lynn and Essex Street in Salem, with the study area including land falling within one-mile of the corridor in all directions. Within the study area are 3.7 miles of Route 107 roadway and fifteen study area intersections.

The Route 107 corridor provides regional connections as well as access to local land uses. In the Lynn section, the study area begins with residential neighborhoods and properties abutting Route 107. As the roadway extends towards Salem, the land use changes to large retail commercial buildings. The middle of the study area has the heaviest congestion, with Marlborough Road and Swampscott Road both providing north-south access into Swampscott and Peabody. The intersections with Route 107 at Marlborough Road and Swampscott Road are part of the “zig zag” movement that is one of the traffic challenges for the study area. Continuing north, Route 107 passes Salem High School and the Salem Hospital, referred to as “Salem Hospital” throughout this report, before terminating at Essex and Boston Street.

Three goals were developed to guide the study towards its purpose of balancing local and commercial traffic with regional connections. Each goal has a set of objectives. The project goals include:

- Improve mobility, connectivity and safety for all transportation modes and users within the Route 107 study area
- Support local economic development goals
- Improve the quality of life for residents and businesses in the Route 107 study area

Evaluation Criteria were developed to analyze the goals and objectives, and as a way to evaluate alternatives and determine if the project is meeting its intended purpose. The evaluation criteria serve as measures of effectiveness used to assess the benefits and impacts of alternatives.

The project involved an extensive public outreach program that included Working Group meetings, public meetings and a public survey. The Working Group met at four strategic points in the project and offered valuable input to shape the project outcome. The public survey, which was initiated early in the project, drew input from over 1,600 participants on the existing issues and desired solutions. Two series of public meetings were held in each of the two communities, Salem and Lynn. The public meetings were intended to inform the public and seek input on the issues, opportunities, solutions and recommendations.

The existing conditions within the study area were assessed through field reviews, data collection, and local input. Field reviews were conducted along both sides of Route 107. Traffic count data was collected in the forms of automatic traffic recordings, manual turning movement counts, and license plate matching. Peak hour traffic volumes by transportation mode, vehicle speeds, vehicle classification and queue lengths were derived from the data collection. Crash data for the study area was reviewed and analyzed. Crash rates were calculated and high crash locations were identified. Bicycle and pedestrian amenities in the study area were cataloged and assessed in terms of their adequacy. The existing transit in the study area consists primarily of four MBTA bus routes that run along Route 107, routes 424, 434, 450 and 456. The ridership, route frequency, span of service, efficiency and bus stop locations were inventoried and assessed.

The demographics of the study area were studied including population and environmental justice population, Information on land use and zoning was collected and mapped. This information along with environmental elements such as floodplains, wetland and water resources, open space and conservation areas, rare species habitat, hazardous material sites and historic and cultural resources was documented in the form of constraint mapping.

Deficiencies in the study area were noted based upon travel mode (vehicle, pedestrian, bicyclist and transit user) and by location (corridor or segment deficiencies and intersection deficiencies). From a traffic operations perspective, the predominant deficiencies include a lack of turn lanes in the Lynn segment, extensive queues, congestion particularly in the center of the project where the zig zag traffic movements occur, and ambiguous travel lanes in the northern segment. Pedestrian amenities are inadequate throughout the corridor. Sidewalks, crosswalk, curb ramps, and pedestrian signals are not consistently provided and the ones that exist are in poor condition. Bicyclists have virtually no facilities under the current conditions. Transit users encounter limited service, long bus rides, and bus stops that lack shelter and adequate pedestrian amenities. Detail of the deficiencies at each of the study area intersections is documented herein.

The 2015 existing peak hour traffic volumes were projected to the year 2035 to determine future traffic demands on the study area roadways. Proposed developments in Lynn and Salem were reviewed to identify potential future traffic generators along the corridor. The traffic generators identified consisted of the proposed Cinema complex in Salem and proposed changes to the Salem Hospital. In addition to specific traffic generators, changes in regional travel demands were estimated based upon information from the Central Transportation Planning Staff's regional traffic demand model.

Roadway improvements for motor vehicles, bicyclists, pedestrians and transit users were considered for the Route 107 study area corridor. The process of developing and evaluating the improvements is summarized below.

- Review existing conditions, survey results & working group input
  - Right-of-Way Constraints
  - Multi-modal Accessibility & Connectivity
  - Environmental Constraints
  - Vehicular Operations
  - Survey Results Working Group Feedback
- Identify study area-wide improvements to meet corridor goals
- Discuss with Working Group and get feed back
- Evaluate feasibility
- Select preferred alternative

In developing the alternatives, study area-wide improvements were developed, particularly for transit. Transit improvements were aimed at improving service by modifying the bus stop locations along Route 107, ensuring that stops are located at locations that provide the desired connections, have a stop pair for the return trip, and have adequate pedestrian and bus stop amenities. From a bicycle perspective, a bicycle lane was recommended throughout most of the study area. Pedestrian improvements include new sidewalks, crosswalks, curb extensions, and pedestrian signals, where appropriate.

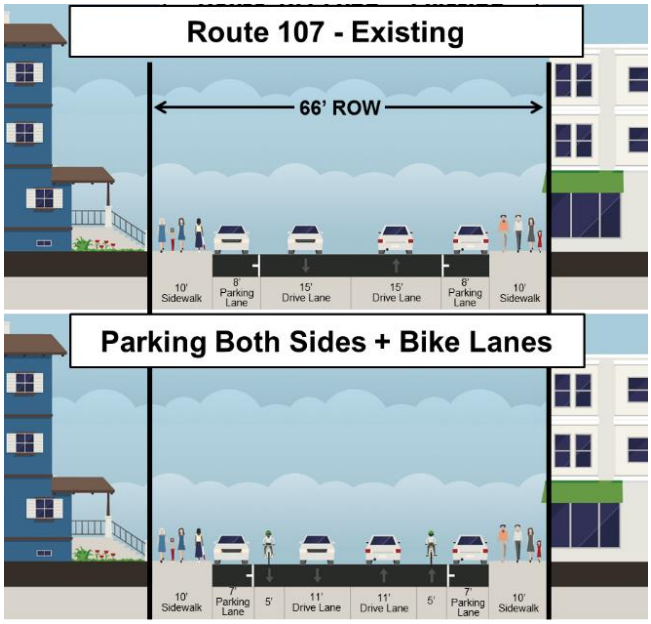


Figure I: Lynn Segment Preferred Option

Roadway cross-sections were developed for each of three roadway segments. The cross-section options were presented to the Working Group, and general consensus was reached on the selection of a preferred roadway cross-section for each of the three roadway segments. In the Lynn segment, the preferred cross-section maintained the existing curb line, on-street parking was provided on both sides of the roadway, and bicycle lanes were added, as shown in Figure I. In the retail segment, the roadway cross-sections were designed to change the roadway atmosphere to be less “freeway style” and more of a boulevard. Four travel lanes were maintained, bicycle lanes were added, and the median was changed to a raised grass median lined with trees. See Figure II. In the northern segment, the cross-sections generally maintained two travel lanes, with a center two-way left turn lane, and bicycle lanes as shown in Figure III.

Particular attention was given to the zig zag area and 17 alternatives were developed. Two of the alternatives involved added capacity along Route 107 only, but these alternatives had substantial right of way impacts and were eliminated. The remaining alternatives involved utilizing First Street and Traders Way to implement travel pattern changes. This is accomplished by signalizing the intersection of Swampscott Road/First Street and implementing turn restrictions. The alternative that restricts the zig zag movement from traveling on Route 107 by implementing turn restrictions was found to be the most effective at reducing congestion. Motorists turning right from Swampscott Road northbound would not be permitted to then turn left onto Marlborough Road. Instead this maneuver would be made by traveling on First Street and Traders Way. Conversely, similar turn restrictions would be set up for movements southbound on Marlborough Road and destined to Swampscott Road, as shown in Figure IV.

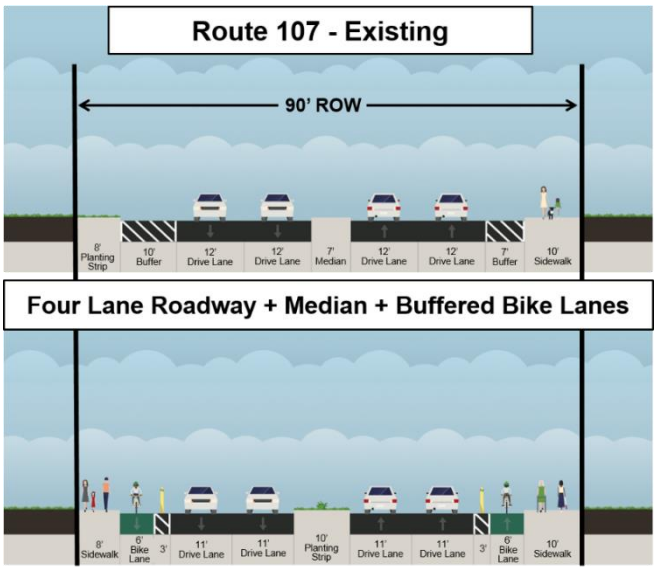


Figure II: Retail Segment Preferred Option

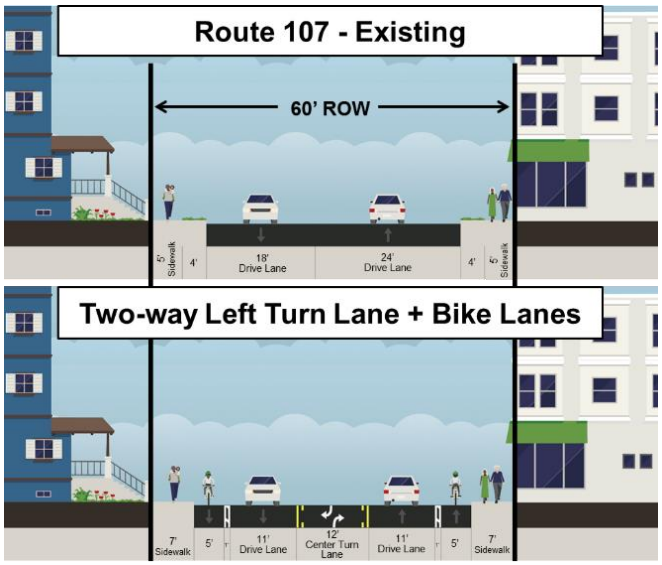


Figure III: Northern Segment Preferred Option

This zig zag proposal received considerable attention from members of the public during the second public meeting in Salem on September 13, 2016, as well as during the public comment period. Concerns were raised about the efficacy of both lane barriers within the Route 107 roadway and the value of redirecting Marlborough-Swampscott movements off Route 107 and onto Traders Way and First Street. These concerns are addressed in Chapter VI of this report. The project team recommends further study to more comprehensively evaluate the traffic operations along Traders Way and First Street in peak periods, including to project the amount of traffic likely to be re-routed and identify improvements along Traders Way and First Street which may be necessary to handle the added traffic. Specific improvements proposed at each intersection are noted in section 5.

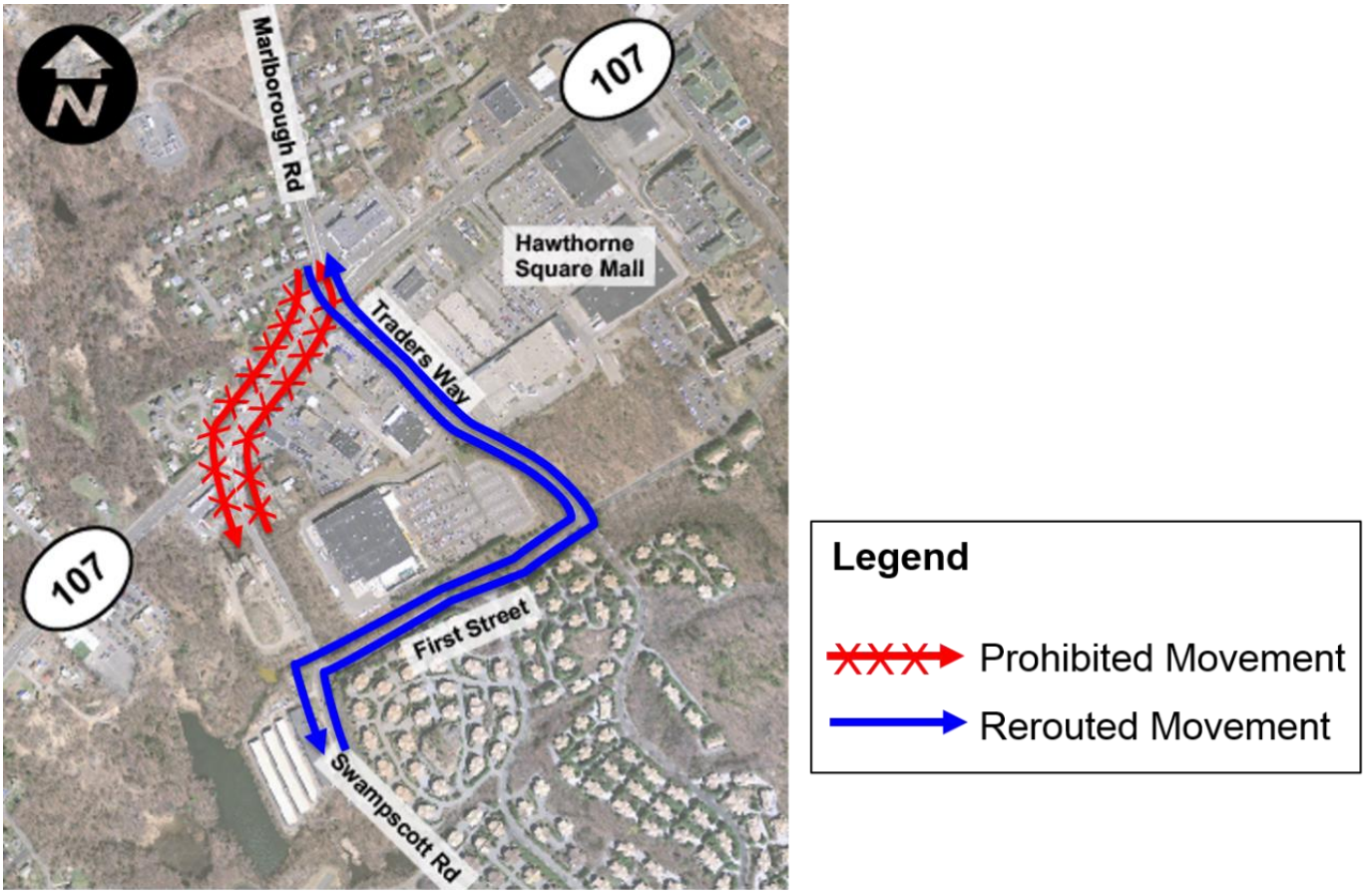


Figure IV: Turn Restrictions for Movements Southbound On Marlborough Road to Swampscott Road

Specific improvements were developed for each of the fifteen study area intersections. The improvements include features such as added turn lanes, access management, improved signal timing, phasing and coordination, added crosswalks, relocated bus stops, curb ramps, bike boxes, and curb extensions.

In the Lynn segment, the intersection improvements were aimed at improving safety. Due to high crash rates at the intersections of Route 107 at Chestnut Street and Route 107 at Chatham Street, exclusive left turn lanes were added. A new traffic signal is recommended for the intersection of Route 107/Eastern Avenue. This signal would operate in conjunction with the existing signal at Route 107 and Waitt Avenue and proposed turn restrictions at both of these intersections would serve to better manage vehicle conflicts.

In the retail segment, there are a number of key signalized intersections and proposed improvements including modifications to the lane arrangements and improved signal timings and coordination. A new traffic signal is recommended at Swampscott Road and First Street and capacity was added at the intersections Route 107 at Marlborough Road and Traders Way and Swampscott Road at First Street.

In the northern segment, intersection improvements were focused on defining the street space to better organize the traffic maneuvers, both on Route 107 and on the side street approaches. For example, proposed modifications to the medians between the side street approaches at the Route 107 and Dalton Parkway/Jackson Street intersection serve to better define travel routes and reduce conflicts. Turn lanes were added or maintained at key intersections. The installation of a traffic signal is recommended at the intersection of Route 107 with the lower driveway of Salem Hospital. Realignment of the Route 107 and Boston Street intersection is proposed to allow the Route 107 traffic to flow as the major movements at this intersection. A shared road concept has been recommended in space surrounding this intersection to accommodate pedestrians and bicyclists, to enhance access management and to provide an opportunity for landscaping and/or the relocation of an existing monument at this intersection.

Collectively, the recommended improvements would transform Route 107 in the study area from a major vehicle thoroughfare to a boulevard type of roadway, serving multiple users and offering a calmer traffic environment.

I. OVERVIEW

A. INTRODUCTION

The Massachusetts Department of Transportation (MassDOT) initiated the Route 107 Corridor Study to evaluate existing transportation conditions within the study area. The main purpose of the study is to understand existing traffic, transit, bicycle, and pedestrian issues and deficiencies, and incorporate each of these modes into recommended improvements. Assessing the potential of future development and economic growth is also a central component to the study. Future year projections were evaluated to understand traffic and development impacts within the study area. The recommendations provide both short-term and long-term improvements for all modes, and are intended to facilitate the creation of a more multimodal transportation corridor, while alleviating the existing transportation deficiencies. The recommendations also balance local traffic and mobility with the need to sustain regional transportation connections.

The study encompasses six tasks:

- Task 1 – Public Involvement Plan
- Task 2 – Field Reconnaissance and Data Collection
- Task 3 – Evaluate Existing Conditions and Identify Transportation Issues
- Task 4 – Develop Improvement Alternatives
- Task 5 – Alternatives Analysis and Recommended Improvements
- Task 6 – Report

This report is divided into six chapters. Chapter 1 provides an overview of the study purpose, process, and public involvement plan. The study goals and objectives and the study area and intersections are also defined in Chapter 1.

B. BACKGROUND

Route 107 is a regional and local roadway that stretches from Revere to Salem in the North Shore area of Massachusetts. It is an arterial roadway running in the northeast-southwest direction through the municipalities of Revere, Saugus, Lynn and Salem, with the corridor serving as a vital link to commercial activities and regional employment centers. The study area runs between Chestnut Street in Lynn and Boston Street in Salem, with the study area including land within one-mile of Route 107 in all directions. Within the study area are 3.7 miles of Route 107 roadway and fifteen study area intersections. Route 107 is known locally as Western Avenue in Lynn and Highland Avenue in Salem until Jackson Street, after which it becomes Essex Street.

C. STUDY PURPOSE

The purpose of the study is to balance local and commercial traffic with regional connections along the Route 107 study area. The current roadway and intersection configurations have a number of operational issues and poorly accommodate pedestrian, bicycle, and transit users. In this study, the existing deficiencies have been documented, the development potential along the study area has been recognized and recommended solutions have been proposed. The study identifies short-term and long-term improvements to address the three main needs of the study area:

- Enhance the current conditions and mitigate or address deficiencies
- Provide accommodations for additional modes of travel
- Accommodate expected growth within the study area

D. GOALS AND OBJECTIVES

Three goals were developed to guide the study towards its purpose of balancing local and commercial traffic with regional connections. Each goal has a set of objectives, which serve to outline specific elements of meeting that goal. Table I.1 provides an overview of the goals and objectives.

Table I.1: Study Goals and Objectives

Goals	Objectives
Improve mobility, connectivity and safety for all transportation modes and users within the Route 107 study area	• Reduce traffic congestion within the study area • Improve safety for vehicles, pedestrians, and bicycles • Improve pedestrian, bicycle, and transit facilities, improve cross-corridor connections
Support Local Economic Development Goals	• Improve traffic operations to support additional development in the study area • Improve access to parcels for all modes
Improve the Quality of Life for Residents and Businesses in the Route 107 study area	• Provide opportunities for enhancing the attractiveness of the study area • Minimize air quality impacts • Provide fair and equitable treatment for Environmental Justice populations

E. STUDY PROCESS

The study process was divided into six tasks, illustrated in Figure I-1. The process began with a public involvement plan and data collection, and ended with a final report. Analysis consisted of evaluating the existing conditions, identifying transportation issues, and developing and analyzing improvement alternatives. Throughout the process there were opportunities for public involvement, described in detail below.

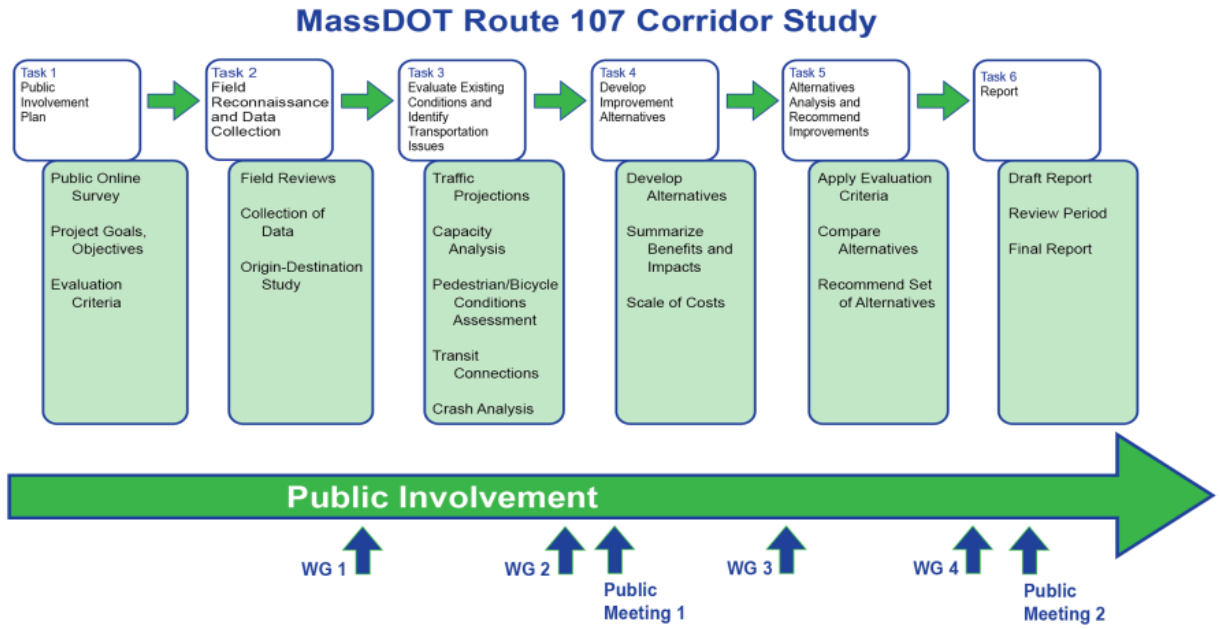


Figure I-1: Study Process

F. EVALUATION CRITERIA

Evaluation Criteria were developed to analyze the goals and objectives, and as a way to evaluate alternatives and determine if the study is meeting its intended purpose. The evaluation criteria serve as measures of effectiveness used to assess the benefits and impacts of alternatives. They provide a way to measure which solutions best achieve the goals and objectives, outlined in Table I.2, through either quantifiable or more subjective qualitative measures. The evaluation criteria were shared with the Working Group prior to becoming finalized.

The criteria were developed with the study purpose in mind as a way to improve the multimodal connectivity and access to business activity within the study area, and improve safety and quality of life. The evaluation criteria are presented in Table I.2

Table I.2: Evaluation Criteria and Measures of Effectiveness

Evaluation Criteria	
Multimodal Mobility	• Reduce Traffic Congestion (LOS) • Cross-corridor mobility • Improve transit, bike, and pedestrian modes
Safety	• Vehicular safety • Bike and pedestrian safety
Land Use and Economic Development	• Supports development • Improves access for all modes
Environmental Effects	• Air quality • Environmental resources
Community, Health, and Social Equity	• Enhance attractiveness for residents and businesses • Health • Environmental Justice
Constructability	• Minimize impacts to private property, drainage & utilities, ledge
Cost	• Construction cost

G. PUBLIC OUTREACH

The public outreach process is outlined in Figure I-1 above. Public involvement was on-going throughout the study and consisted of three major components including Working Group meetings, public meetings and a public survey.

The goals of the public involvement program are to:

- Reach out early and frequently to invite the public to participate in the study process.
- Distribute timely and accurate information to ensure transparency.
- Provide continuous and meaningful opportunities for public involvement and respond promptly to inquiries.

- Develop and maintain positive relationships with city officials, Working Group members, community leaders, business owners, residents and other stakeholders.
- Collaborate with the Working Group to gather data on intersections along the study area and develop a set of feasible improvement alternatives that best address existing problems.
- Communicate study updates and announcements across several platforms in easy-to-understand and accessible formats. Translations into Spanish and specific communication strategies will be necessary to engage all affected communities (including minority, low-income, and limited-English proficiency populations).

The elements of the public outreach process are listed below and some of the elements are described in more detail in the sections to follow:

- **Electronic database**; which included contact information of property and business owners, relevant agency departments, community and neighborhood organizations, chambers of commerce, cultural and religious organizations, schools, bicycle and pedestrian advocacy groups, social services, and local publications.
- **Internet Communications**; which included the development and maintenance of a study website, email blasts announcing the study's activity, and use of social media to share the study's information. The study website is found at http://www.massdot.state.ma.us/planning/Main/CurrentStudies/Route107CorridorStudy.aspx
- **Print materials;** including meeting handouts.
- **Press Outreach**
- **Working Group Meetings**
- **Public Meetings**
- **Online Survey**

1. WORKING GROUP

A Working Group was essential to the public outreach and stakeholder engagement process of the study. The membership of the Working Group is listed in Figure I-2. The goals for the Working Group were to:

- Provide local knowledge and perspective
- Convey community ideas and suggestions
- Learn historical context
- Seek out a variety of representation

Local	Lynn Housing Authority & Neighborhood Development	Lynn City Council
Salem Commission on Disabilities	Lynn Area Chamber of Commerce	**Regional**
City of Lynn	Lynn Department of Public Works	North Shore Medical Center
Lynn Police Department	Lynn Department of Community Development	Essex County Community Organizations
Economic Development & Industrial Corporation (EDIC) Lynn	Lynn Disability Commission	North Shore Community Development Coalition
The Salem Partnership	City of Salem	Metropolitan Area Planning Council
Salem Chamber of Commerce	Salem Public Schools	North Shore TMA
Inspectional Services Department and Lynn Planning Board	Lynn Council On Aging	**State**
Department of Planning and Community Development (DPCD)	Salem Mass in Motion Program Coalition	Massachusetts House of Representatives
Salem Bicycling Advisory Committee	Salem Police Department	Massachusetts Senate
Salem City Council	Salem Education Foundation / Salem Latino Leadership Coalition	
Salem Council on Aging	Salem Planning Board	

Figure I-2: Working Group Members

A series of four Working Group meetings were held at strategic points during the study and the Working Group input shaped the content and direction of the study. The Working Group meetings were well attended and the group was engaged in the process. The group offered input throughout and the study recommendations are reflective of the group's input.

Each of the four Working Group meetings is briefly described below and meeting notes for each Working Group meeting is provided in the Appendix of this report.

Working Group Meeting 1, June 10, 2015

The first Working Group meeting was held at the Salem City Hall Annex, 120 Washington Street, in Salem, Massachusetts. The topics covered included:

- Study purpose
- Study process
- Role of the Working Group
- Goals and objectives
- Data collection including roadway jurisdiction, traffic counts by mode, and trip origins and destinations
- Field review information regarding the amenities by mode
- Existing land use conditions (zoning, land use, environmental justice, environmental considerations, historic resources)

Working Group Meeting 2, October 20, 2015

The second Working Group meeting was also held at the Salem City Hall Annex, 120 Washington Street, in Salem, Massachusetts. The topics covered included:

- Public survey outreach
- Expanded study area
- Traffic operations
- Transportation issues and deficiencies by travel mode and presented both from a corridor and intersection perspective
- Design constraints

Working Group Meeting 3, March 2, 2016

The third Working Group meeting was held at Lynn City Hall at 3 City Hall Square, Lynn, Massachusetts. The topics covered included:

- Public survey results
- Future traffic volumes
- Overall improvement alternative concepts for vehicles, pedestrians, bicycles and traffic calming
- Improvement alternative concepts by segment; Lynn segment, retail segment including concepts for the movements between Swampscott Road and Marlborough Road (commonly referred to as the “zig zag”), and the northern segment

Working Group Meeting 4, June 30, 2016

The fourth Working Group meeting was held at the Salem City Hall Annex, 120 Washington Street, in Salem, Massachusetts. The topics covered included:

- Segment by segment improvements including both study area segment improvements and improvements at key intersections within each segment
- Additional design concepts for the zig zag area

Following the fourth Working Group meeting and prior to the second set of public meetings, the following information was made available to the Working Group:

- Design concepts at the zig zag intersections
- Cost estimates for the recommended improvements

2. PUBLIC MEETINGS

Public meetings were held in each of the two communities; Lynn and Salem. Two series of public meetings were conducted. The first set of public meetings occurred towards the end of the third study task and were held January 27, 2016 at Salem High School Auditorium and March 9, 2016 at Lynn English High School Auditorium. A briefing was held at the Fairweather Apartments located at 40 Highland Avenue, Salem, Massachusetts in advance of each of the public meetings. The briefings were arranged in response to a request to share the study information with house-bound residents.

The content at the first public meetings included the following:

- Study framework
- Existing transportation conditions including:
    - roadway jurisdiction,
    - vehicle/pedestrian/bicycle count information,
    - origin-destination data for the “zig zag” movement
    - existing transit conditions
    - mapping of land use, zoning, environmental resources, environmental justice areas, and cultural and historic resources
- Existing traffic operations
- Projected traffic volumes
- Transportation issues and deficiencies identified by mode and for the study area and key intersections

The second set of public meetings occurred on September 7, 2016 at Lynn English High School Auditorium and on September 13, 2016 at the Collins Middle School Auditorium.

The content at the second public meetings included the following:

- Study process
- Public survey results
- Overall improvement concepts
- Segment by segment improvements including recommendations for cross-sections and specific intersection improvements

Both sets of public meetings were well attended and participants were engaged in the discussion. The public meeting materials including the presentation and summary notes are posted on the MassDOT website. Summaries of the public meetings are included in the Appendix.

3. ONLINE SURVEY

An online survey was conducted to obtain users input on issues and recommendations. The survey was available from October 14, 2015 to February 1, 2016 in both English and Spanish. The survey was distributed using a variety of methods:

- Bilingual email distribution to study email list
- Bilingual flyers were distributed to residences and businesses on Route 107
- Shared by the Working Group
- Advertised in newspapers and media advisory

The survey generated over 1,600 responses. The survey questions and results are provided in the Appendix.

Survey respondents were mainly comprised of residents of the study area (47%) and workers of the study area (20%). The average age of survey respondents is slightly older than the age group profile of Essex County, with over 45% of respondents between the ages of 45 and 64.[1]

The top three study area destinations for respondents are Walmart, the Hawthorne Square Mall, and the Salem Hospital. Over 90% of respondents own a private automobile. With many drivers within the study area, it is not unexpected that the majority of respondents also reported experiencing traffic congestion “frequently” or “usually” in all parts of the study area. The segments of the study area between Walmart and Hawthorne Square Mall in Salem and Chestnut Street to Eastern Avenue in Lynn had higher rates of experienced congestion among respondents. Safety improvements were also seen as most needed on the segment from Walmart to the Hawthorne Square Mall.

The majority of respondents report that they use a personal vehicle to commute to work and for recreation. Very few respondents ever take public transportation, walk, or bicycle in the study area. Over 70% of respondents “never” walk in the Route 107 area to commute to school or work, and 43% never walk for recreation purposes. Barriers to walking include crossings that are too few and inconvenient, a lack of sidewalks, lack of sidewalk maintenance/clearance of snow, and failure to enforce laws to protect pedestrians from traffic.

Although about 30% of respondents are “casual” or “experienced” bicyclists, over 90% of respondents report “never” using a bicycle to access public transit, or to commute to school or work. The segment where respondents are least likely to bicycle is from Chestnut Street in Lynn to Walmart in Salem.

Public transportation use is also minimal within the study area. Recreation was the most common reason to use public transit, but even for that use, 76% of respondents reported

[1] 2010 U.S. Census

"never" using it. The largest barriers to using public transportation were reported as that it is not as convenient as a personal vehicle, it does not go where respondents want to go, and that respondents make multiple stops during trips.

Survey respondents also provided input on suggested improvements. These included:

Roadway Improvements:

- The addition of left-turn lanes
- A median separation with U-turn provisions
- Right-in, right-out driveway access (no left turns in and out)
- Sidewalk bump-outs for traffic calming

Pedestrian Improvements:

- Better sidewalk maintenance
- Better lighting and security measures
- Increased buffer between the sidewalk and vehicle traffic
- Improved curb ramps and accessibility

Bicycle Improvements

- Increased maintenance
- Off-road bicycle paths
- Improved buffers between bicyclists and vehicles
- Enforcement and education

H. STUDY AREA

The Route 107 study area, displayed in Figure I-3, extends 3.7 miles between the City of Lynn and the City of Salem. The Route 107 corridor provides regional connections as well as access to local land uses. The land uses surrounding Route 107 influence the roadway character and function. In Lynn, the study area begins with residential neighborhoods and properties abutting Route 107. As the roadway extends towards Salem, the land use changes to large retail commercial buildings. Continuing north, the study area passes Salem High School and the Salem Hospital before terminating at Essex and Boston Street.

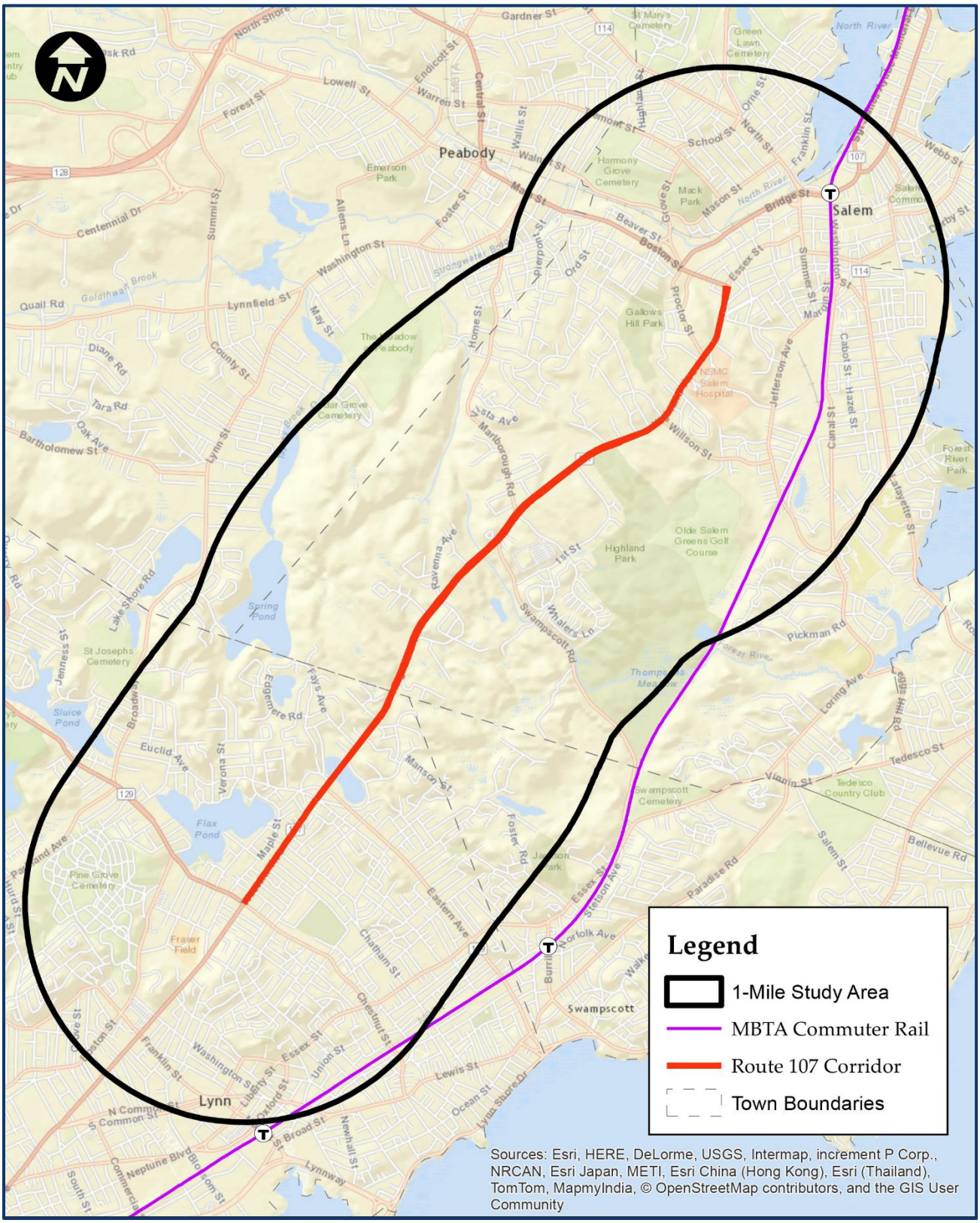


Figure I-3: Route 107 Study Area

Initially, the study area included ten key intersections. At the suggestion of the Working Group, the study area was expanded northerly and southerly to include five additional key intersections; two in Lynn and three in Salem. The fifteen intersections included in the study area are shown in Figure I-4 and listed below:

Intersections in Salem

1. Essex Street (Route 107) at Boston Street (Route 107)
2. Essex Street/Highland Avenue (Route 107) at Jackson Street/ Dalton Parkway
3. Highland Avenue (Route 107) at Hospital Lower Driveway
4. Highland Avenue (Route 107) at Willson Street/Cherry Hill Avenue
5. Highland Avenue (Route 107) at the Hawthorne Square Mall Shopping Center Driveway
6. Highland Avenue (Route 107) at Marlborough Road/Traders Way
7. Highland Avenue (Route 107) at Swampscott Road/Dipietro Avenue
8. Highland Avenue (Route 107) at Barnes Road/Ravenna Avenue
9. Highland Avenue (Route 107) at Olde Village Drive
10. Highland Avenue (Route 107) at the Wal-Mart Driveway

Intersections in Lynn

1. Western Avenue (Route 107) at Fays Avenue
2. Western Avenue (Route 107) at Eastern Avenue
3. Western Avenue (Route 107) at Maple Street/Waitt Avenue/President Street
4. Western Avenue (Route 107) at Chatham Street
5. Western Avenue (Route 107) at Chestnut Street (Route 129A)

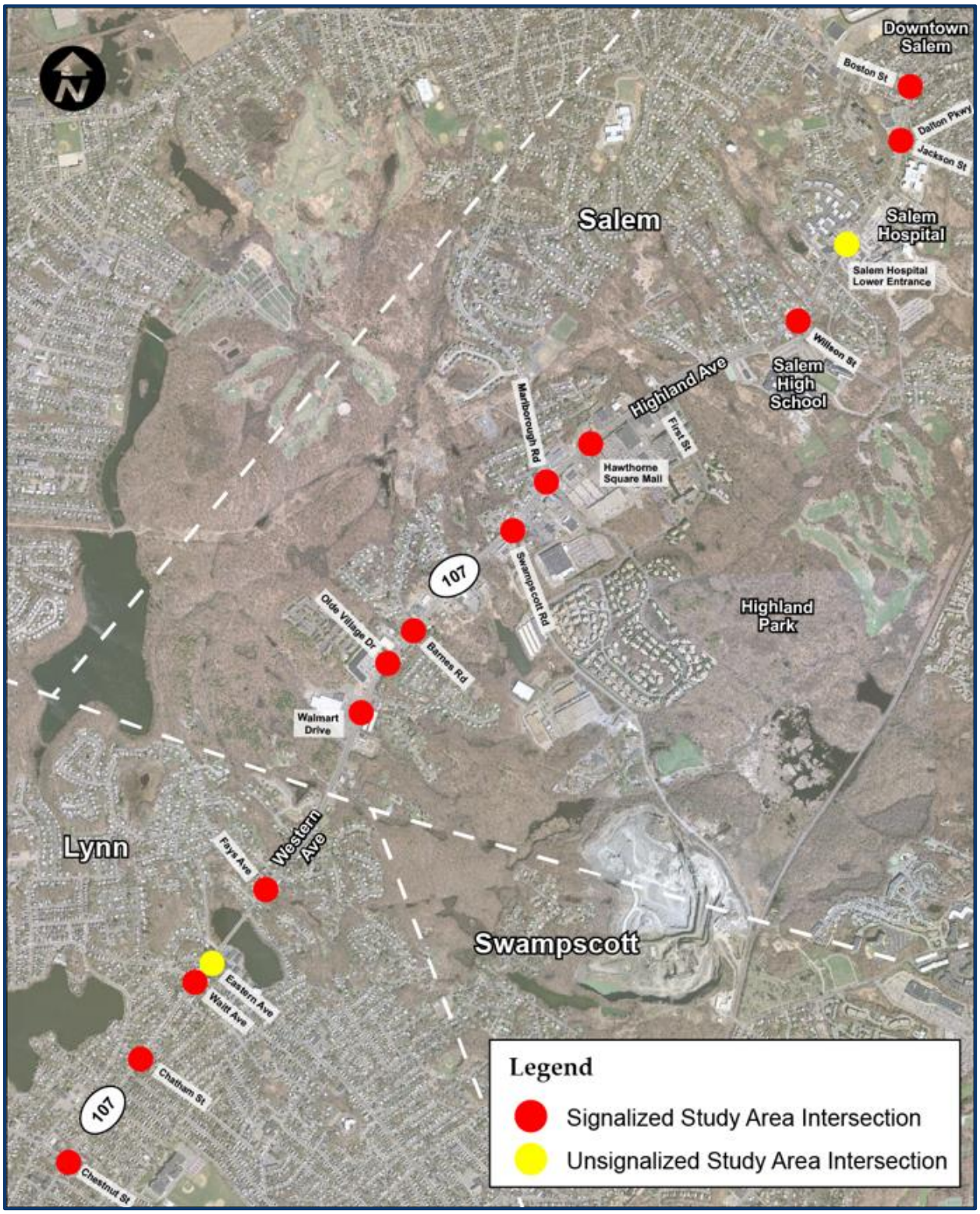


Figure I-4: Study Area Intersections

II. EXISTING CONDITIONS

A. INTRODUCTION

The Route 107 study area extends from the south at Chestnut Street in Lynn approximately 3.7 miles to the north to Boston Street in Salem. The study area has three fairly distinct roadway segments that are characterized by the overall right-of-way width and adjacent land uses. The southern roadway segment of the Route 107 study area extends from Chestnut Street to the Salem/Lynn City line. This segment features a 66-foot right-of-way and is primarily one lane in each direction providing access to adjacent residential housing and small commercial properties. The central roadway segment from the Lynn/Salem City line to Freeman Road features a 90-foot right-of-way and is primarily characterized by two travel lanes in each direction with large commercial properties along both sides of the roadway. The northernmost segment of the Route 107 study area from Freeman Road to Boston Street features a 60-foot right-of-way and provides access to schools, hospitals and residential uses via one or two travel lanes in each direction. The roadway segments as described here are depicted in Figure II-1.

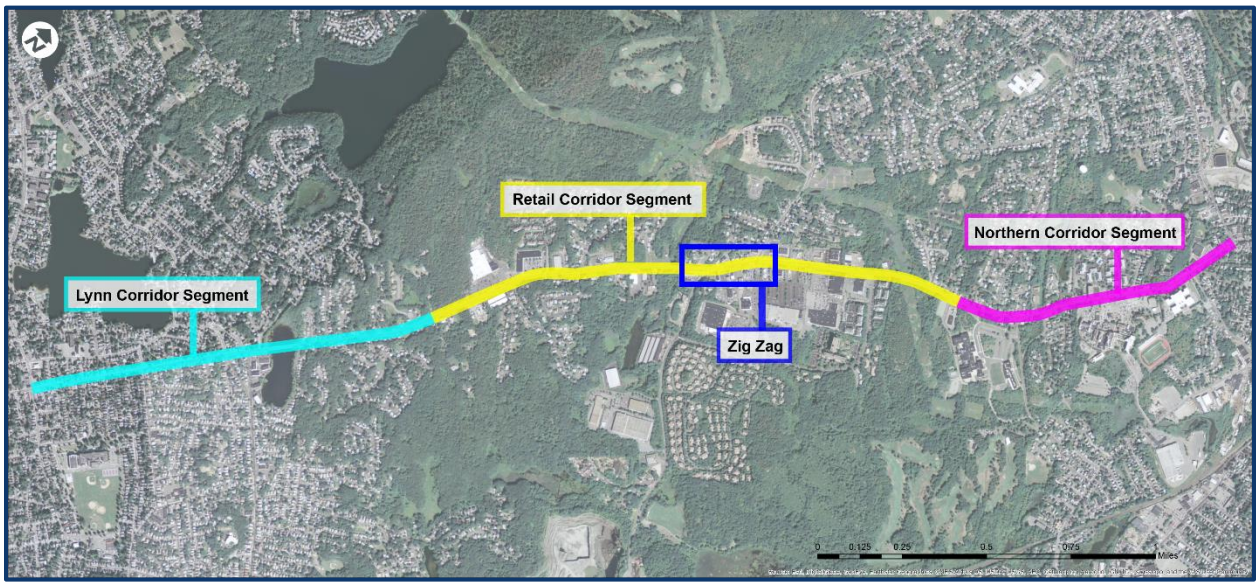


Figure II-1: Route 107 Segments

The jurisdiction of Route 107 varies, with MassDOT jurisdiction extending from the southern end of the Buchanan Bridge to Greenway Road and the remainder of the study area falling under the jurisdiction of the local municipalities, as depicted in Figure II-2. The study area of the Route 107 study includes 15 intersections, of which thirteen are signalized and two are unsignalized, as shown in Figure I-4 in Chapter 1. Table II.1 below summarizes the location, jurisdiction, and traffic control for each of the 15 study area intersections.

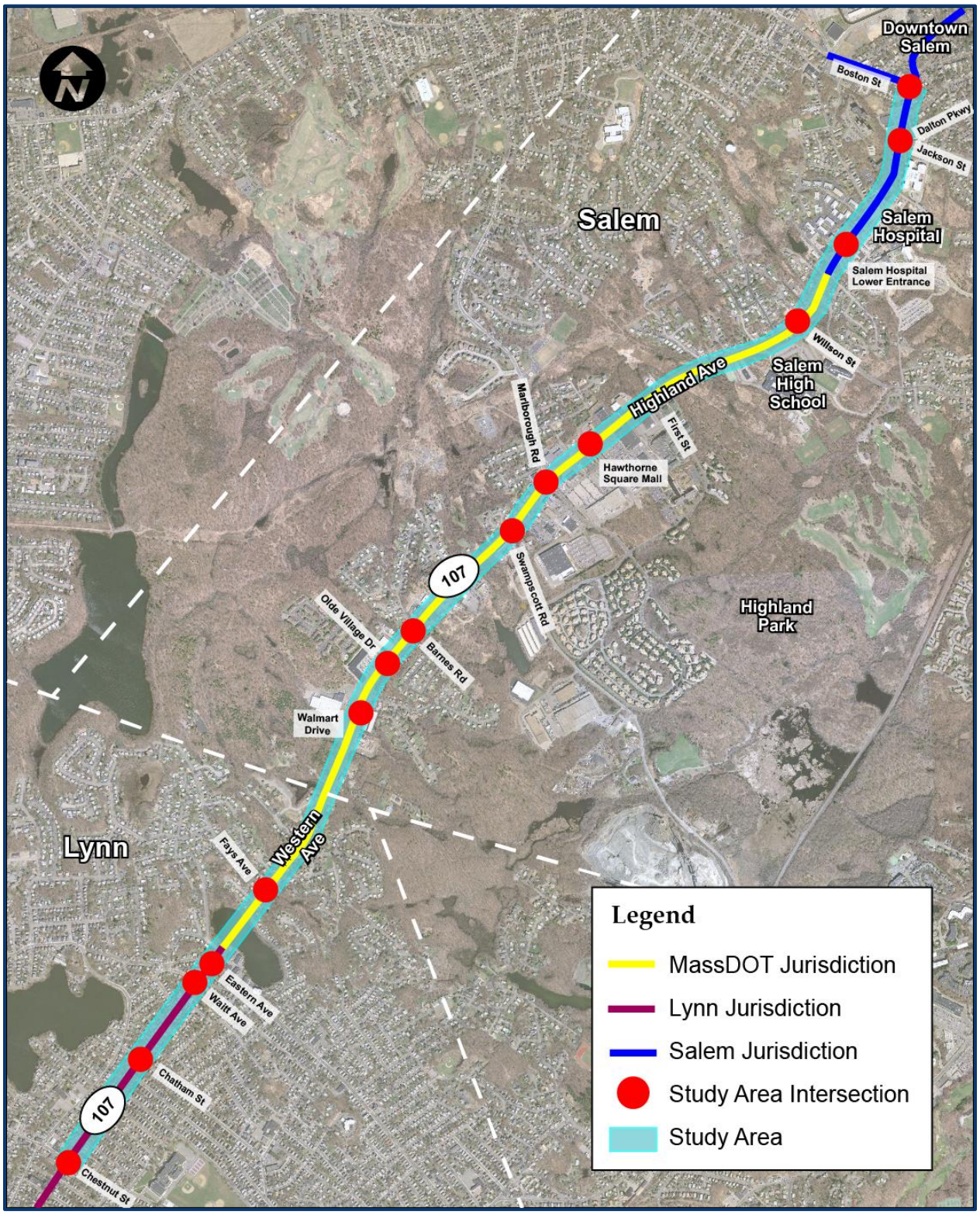


Figure II-2: Route 107 Jurisdictions

Table II.1: Intersection Summary

Intersection	City	Jurisdiction	Control
Chestnut Street	Lynn	Local	Signalized
Chatham Street	Lynn	Local	Signalized
Maple Street/Waitt Avenue	Lynn	Local	Signalized
Eastern Avenue/Stanwood Street	Lynn	Local	Unsignalized
Fays Avenue	Lynn	MassDOT	Signalized
Walmart Driveway	Salem	MassDOT	Signalized
Olde Village Drive	Salem	MassDOT	Signalized
Barnes Road/Ravenna Avenue	Salem	MassDOT	Signalized
Swampscott Road/Dipietro Avenue	Salem	MassDOT	Signalized
Marlborough Road/Traders Way	Salem	MassDOT	Signalized
Hawthorne Square Mall/Site Drive	Salem	MassDOT	Signalized
Cherry Hill Avenue/Willson Street	Salem	MassDOT	Signalized
Lower Driveway of Salem Hospital	Salem	Local	Unsignalized
Jackson Street/Dalton Parkway	Salem	Local	Signalized
Boston Street (Route 107)	Salem	Local	Signalized

B. TRAFFIC CONDITIONS

1. DATA COLLECTION

Turning Movement Counts

In order to determine peak hour traffic volumes within the Route 107 study area, turning movement counts were collected at the fifteen study area intersections, shown in Figure II-3. To assess peak hour traffic conditions, manual turning movement counts were conducted at each of the study area intersections, during the weekday morning (7:00AM-10:00AM), weekday afternoon (3:00PM-7:00PM), and Saturday midday (10:00AM-2:00PM) peak periods. The intersection counts were collected on fair weather days and collected the volume of motor-vehicles, heavy vehicles, bicyclists, and pedestrians during each of the peak periods studied.

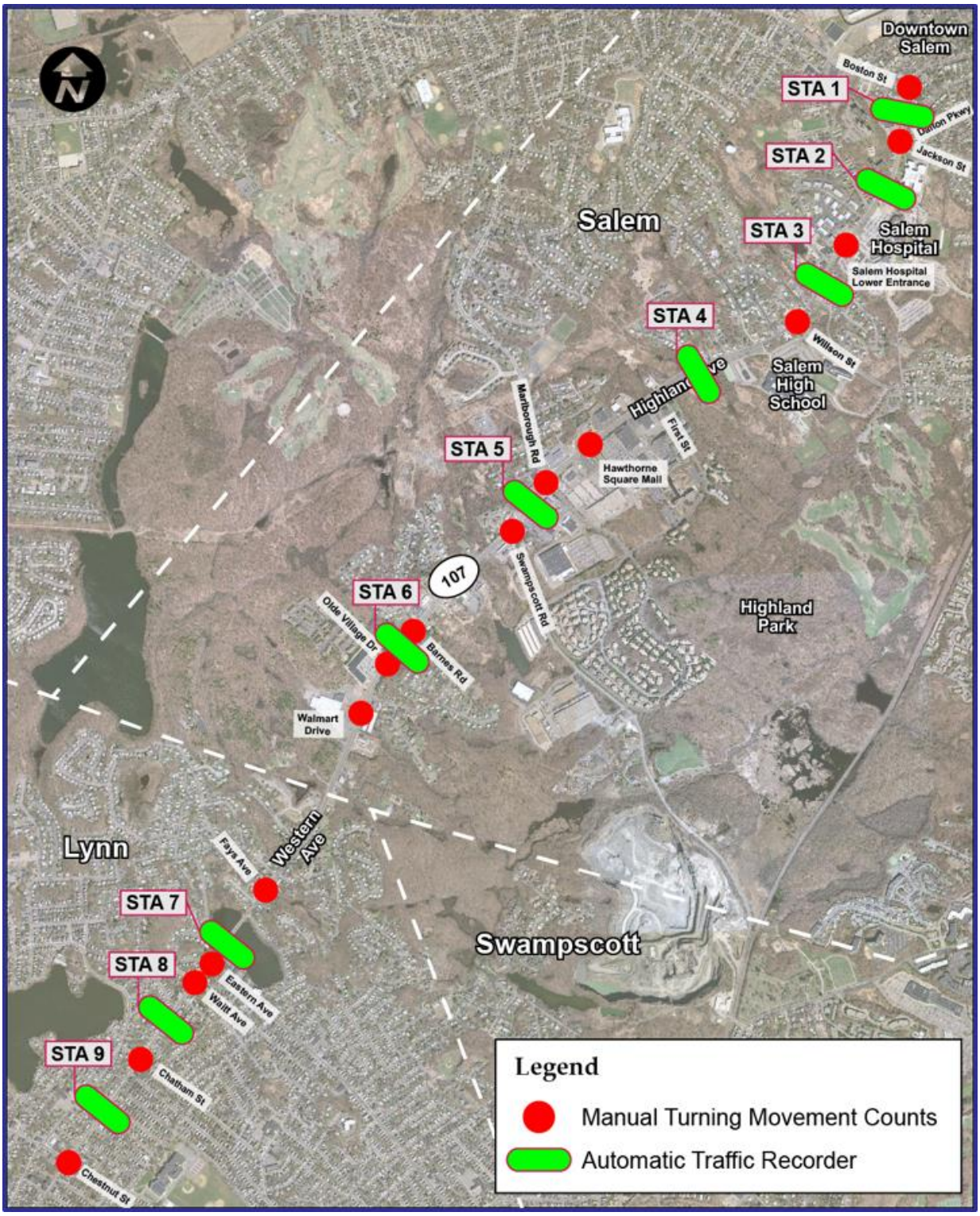


Figure II-3: Route 107 Turning Movement Counts

Turning movement counts were collected on Thursday, April 2, 2015 and on Saturday, April 11, 2015 for the original ten intersections as listed below:

Intersections in Lynn

- Route 107 (Western Avenue) at Maple Street/Waitt Avenue
- Route 107 (Western Avenue) at Eastern Avenue/Stanwood Street
- Route 107 (Western Avenue) at Fays Avenue

Intersections in Salem

- Route 107 (Highland Avenue) at Walmart Driveway
- Route 107 (Highland Avenue) at Olde Village Drive
- Route 107 (Highland Avenue) at Barnes Road/Ravenna Avenue
- Route 107 (Highland Avenue) at Swampscott Road/Dipietro Avenue
- Route 107 (Highland Avenue) at Marlborough Road/Traders Way
- Route 107 (Highland Avenue) at Hawthorne Square Mall Shopping Center Driveway
- Route 107 (Highland Avenue) at Cherry Hill Avenue/Willson Street

Additional intersection turning movement count data was collected for the expanded study area intersections on Thursday, July 30, 2015 and Saturday, August 1, 2015 at the following locations:

Intersections in Lynn

- Route 107 (Western Avenue) at Chestnut Street
- Route 107 (Western Avenue) at Chatham Street

Intersections in Salem

- Route 107 (Highland Avenue) at Salem Hospital Lower Driveway
- Route 107 (Highland Avenue/Essex Street) at Jackson Street/Dalton Parkway
- Route 107 (Essex Street) at Boston Street (Route 107)

The results of the manual turning movement counts are tabulated by 15-minute periods and are provided in the Appendix of this report. Based on the traffic counts, the study area-wide weekday morning peak hour occurs between 7:15 AM and 8:15 AM, the study area-wide weekday afternoon peak hour occurs between 3:30 PM and 4:30 PM and study area-wide the Saturday midday peak hour occurs between 12:15 PM and 1:15 PM.

Automatic Traffic Recorders

Automated traffic recorder (ATR) data was collected at nine locations along Route 107 within the study area, as depicted in Figure 2.3 above. Traffic volume data was collected for a seven-day period to provide average daily traffic volumes at each location within the study area. The ATR data collection was completed from Tuesday, March 31, 2015 through Monday, April 6, 2015 and from Wednesday, July 29, 2015 through Tuesday, August 4, 2015. Traffic volumes recorded along Route 107 by the ATRs are shown in Figure II-4. The ATR data is provided in the Appendix.

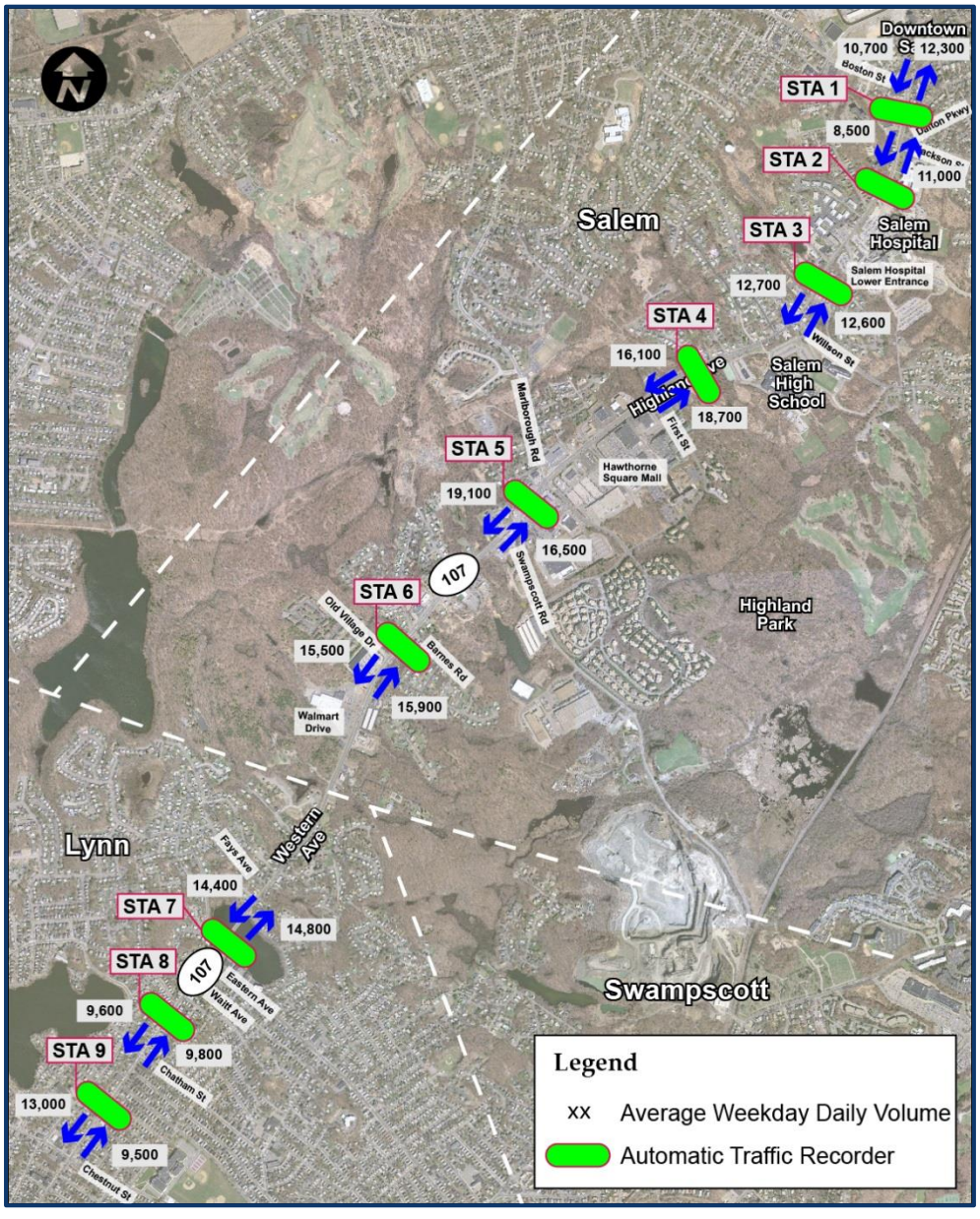


Figure II-4: Route 107 ATR Volumes

Origin-Destination

An origin-destination (O-D) study was completed between the intersections of Route 107 and Marlborough Road/Traders Way and Route 107 and Swampscott Road. The O-D survey was used to determine the amount of traffic using Route 107 to travel between Marlborough Road and Swampscott Road, also known as the zig zag. To determine the number of vehicles traveling from Swampscott Road to Marlborough Road via Route 107, license plates were recorded for westbound vehicles turning right from Swampscott Road onto Route 107 and for northbound vehicles turning left from Route 107 onto Marlborough Road from Route 107. To determine the number of vehicles traveling from Marlborough Road to Swampscott Road via Route 107, license plates were recorded for the eastbound right turn from Marlborough Road onto Route 107 and for the southbound left turn from Route 107 onto Swampscott Road. The license plate data was then matched to determine the number of vehicles completing the zig zag movement in each direction.

The O-D data was collected for two consecutive hours during each of the peak periods on Thursday, April 9, 2015 from 7-9 AM and 4-6 PM and on Saturday, April 11, 2015 from 11:30 AM to 1:30 PM. The results of the O-D study are depicted in Figure II-5. The results of the zig zag movement were fairly consistent in each direction. Nearly half of the traffic turning left from Route 107 northbound to Marlborough Road originated on Swampscott Road. Similarly nearly half of the traffic turning left from Route 107 southbound onto Swampscott Road originated from Marlborough Road.

Deficiency Audit

The roadway conditions were cataloged throughout the study area to identify deficiencies for each mode within the study area. Operational observations were conducted at each study area intersection during the peak periods of travel. The findings of the deficiency audit are discussed in further detail in subsequent sections of this study.

Vehicles

Data collected for vehicles was used primarily to model vehicle delays and queues within the study area. Lane configurations, traffic volumes, and queue calibration were utilized to set up the existing conditions in Synchro, a computerized capacity analysis program.

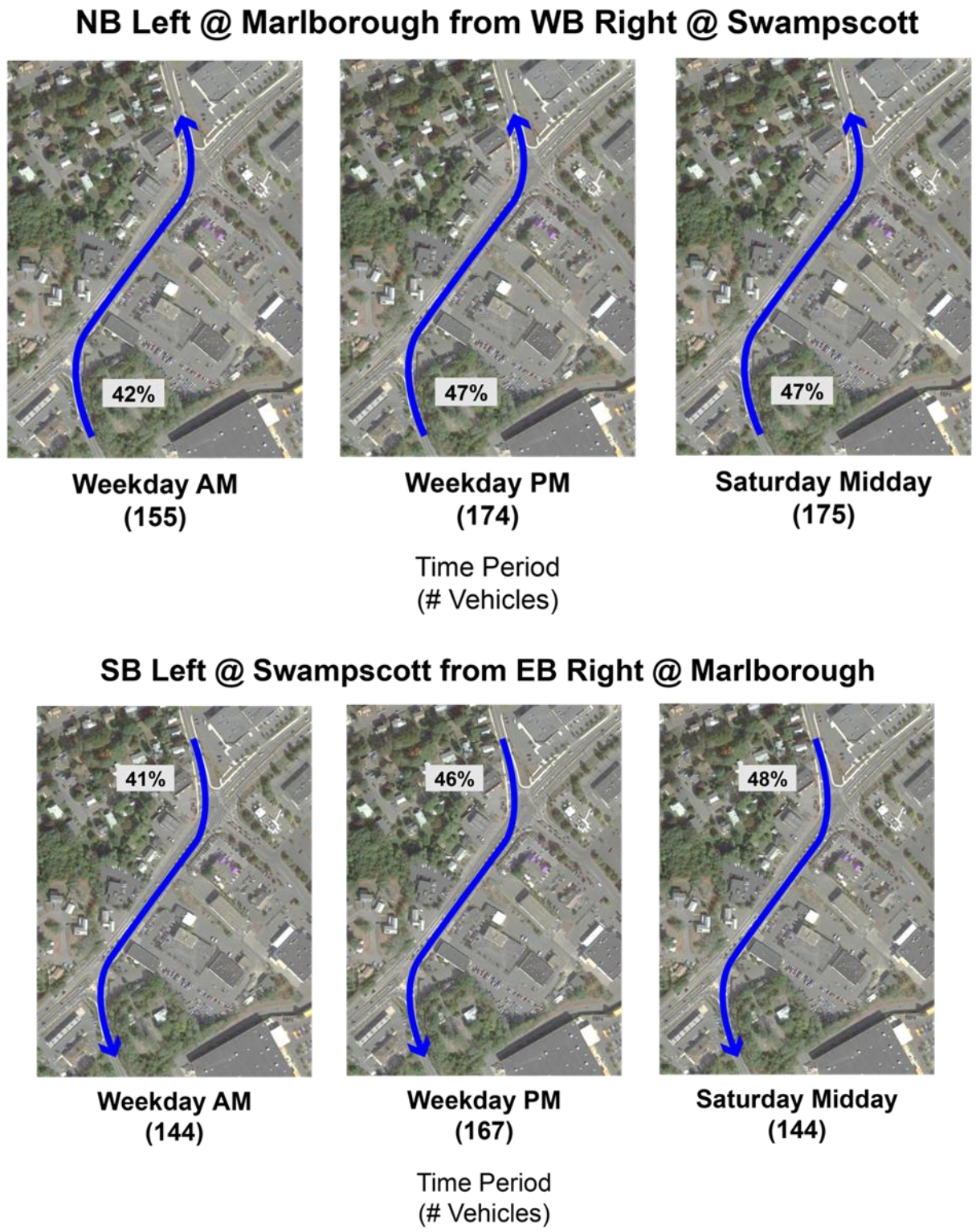


Figure II-5: Results of O-D Study

Traffic Lane Configurations

Lane configurations at each of the study area intersections within the Route 107 study area were inventoried using existing traffic signal plans and record plans and then were verified in the field. In the southern Lynn section, Route 107 typically provides one travel lane in each direction with on-street parking on both sides of the street. North of Fays Avenue, through the commercial section in Salem, Route 107 provides two lanes travel lanes with auxiliary turn lanes in each direction with no on-street parking. North of the lower Salem Hospital driveway, the Route 107 study area reduces to one travel lane in each direction with auxiliary turn lanes at signalized intersections and limited on-street parking. The lane configurations for each for the study area intersections are presented in Figure II-6.

Seasonal Adjustment

Traffic count data varies throughout the year due to seasonal activities. Based upon continuous count data in the vicinity of the study area, traffic volumes collected during the months of April and July are higher than traffic volumes for the average month by approximately 1% to 7%. Therefore, to provide a conservative analysis, the existing peak hour traffic volumes were not seasonally adjusted.

Traffic Volume Summary

Based on a review of the traffic count data, the weekday morning and weekday afternoon peak hours on Route 107 occur between 7:15 AM and 8:15 AM and 3:30PM and 4:30PM, respectively. The Saturday midday peak hour is shown to occur between 12:15 PM and 1:15 PM. The existing peak hour traffic volumes are shown graphically in Figure II-7, Figure II-8, and Figure II-9 for the weekday morning, weekday afternoon, and Saturday midday peak hours, respectively. Detailed traffic volume schematics are provided in the Appendix.

Truck percentages along Route 107 were calculated based upon vehicle classification data collected for this study. The daily truck percentages along Route 107 are generally two percent of the total traffic.

Trucks are permitted to travel along Route 107 in the study area. There are truck exclusions on roadways that intersect with Route 107 in the study area including the following:

- Marlborough Road
- Colby Street
- Proctor Street
- Dalton Parkway
- First Street

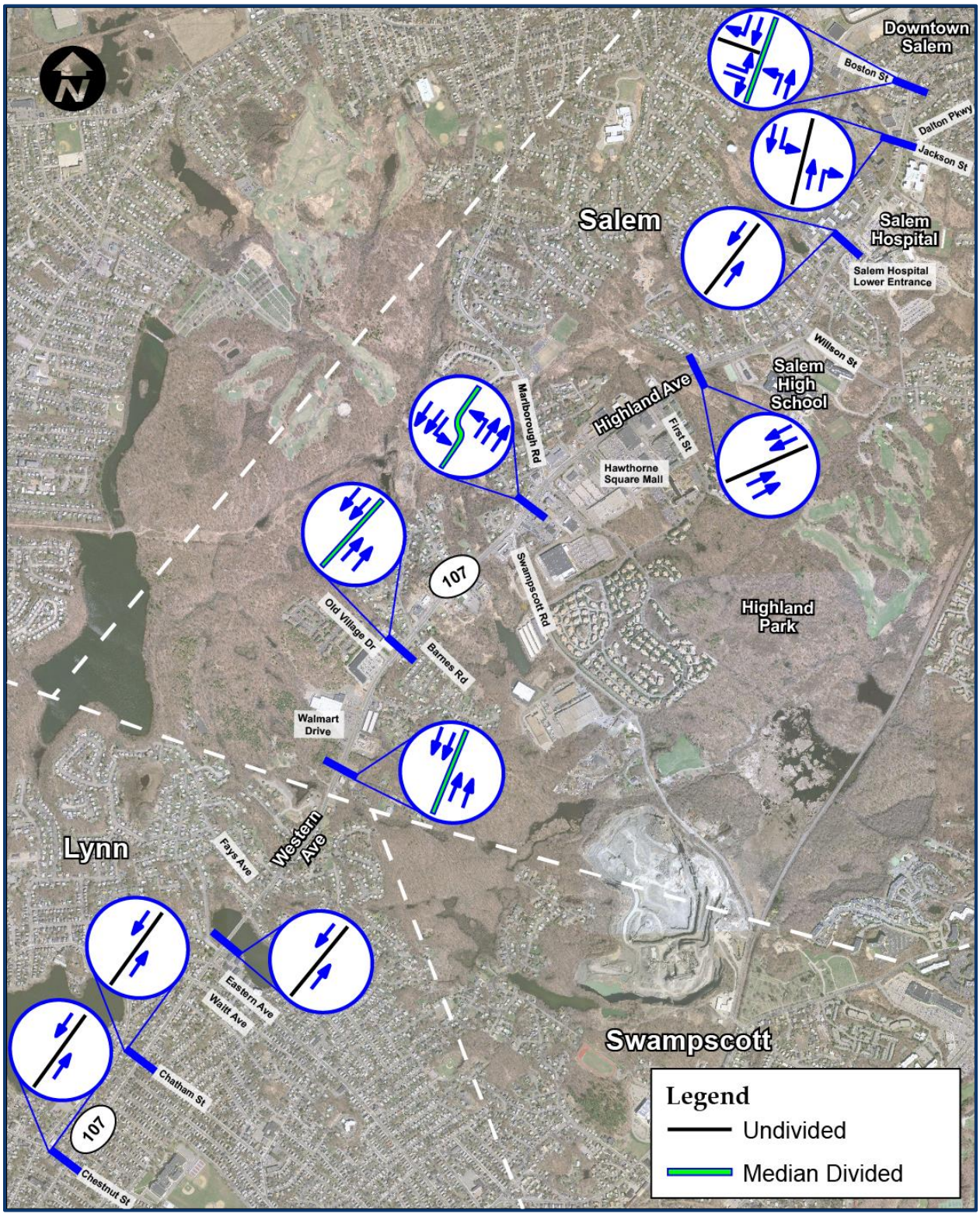


Figure II-6: Route 107 Lane Configurations

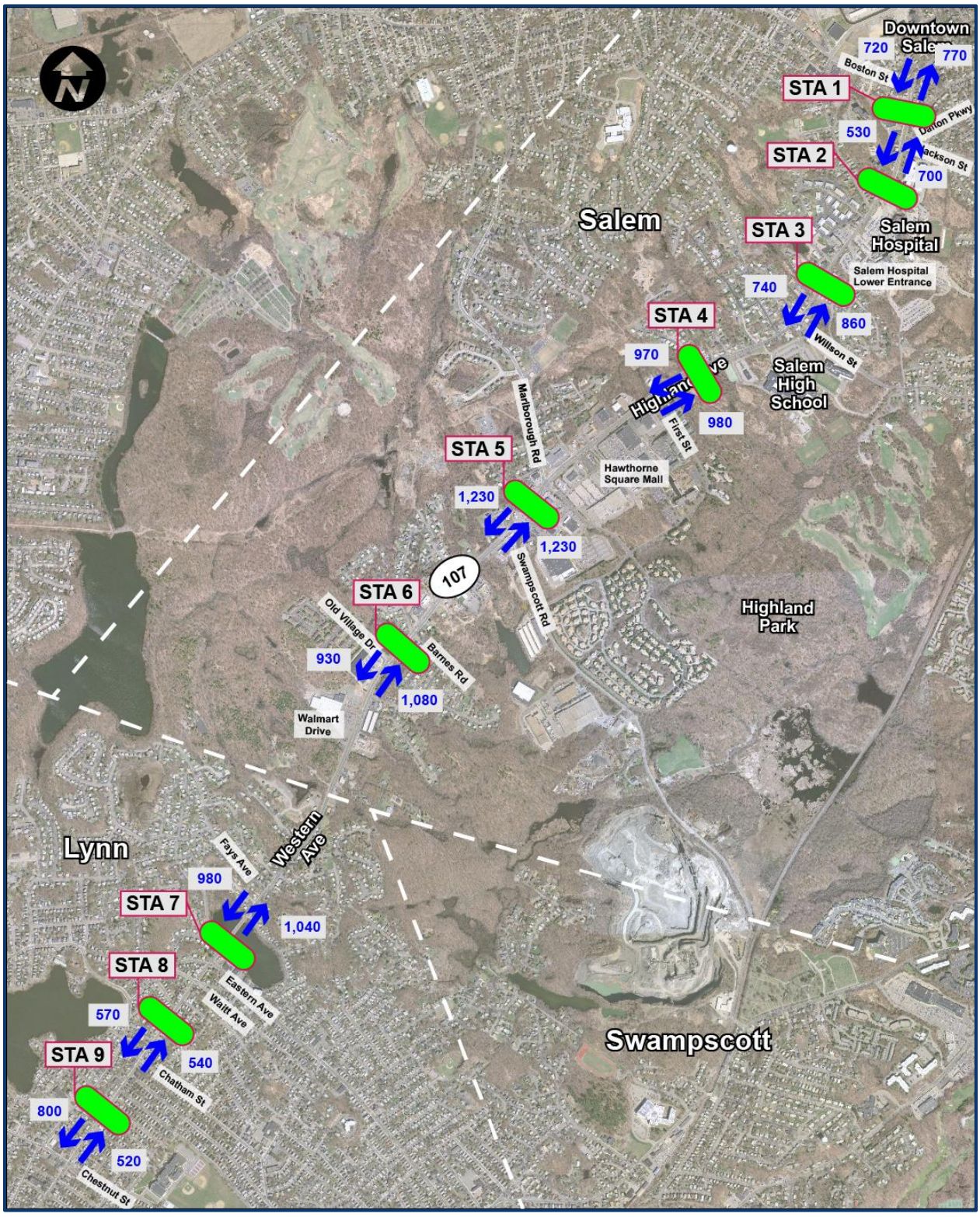


Figure II-7: Existing AM Peak Hour Traffic Volumes

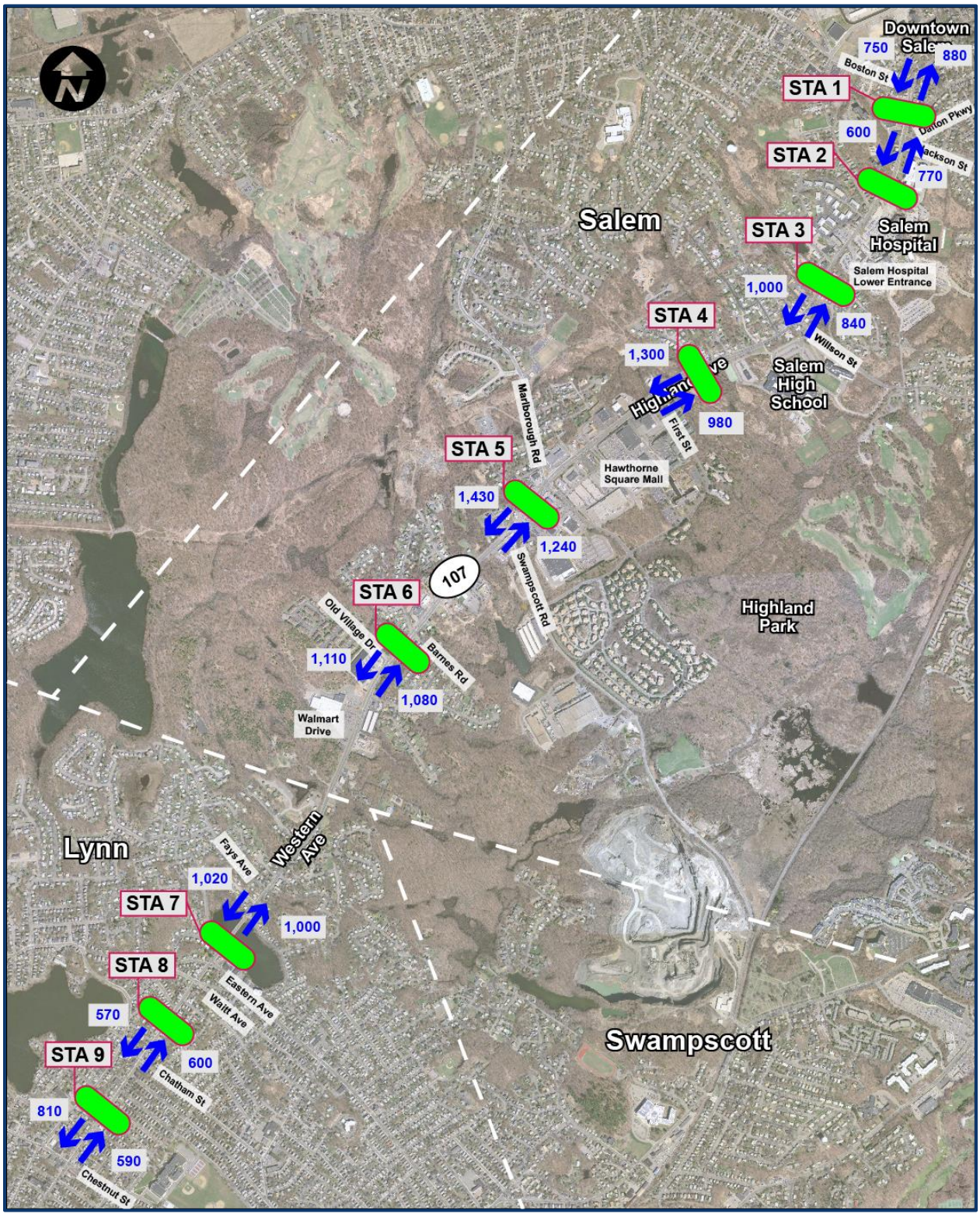


Figure II-8: Existing PM Peak Hour Traffic Volumes

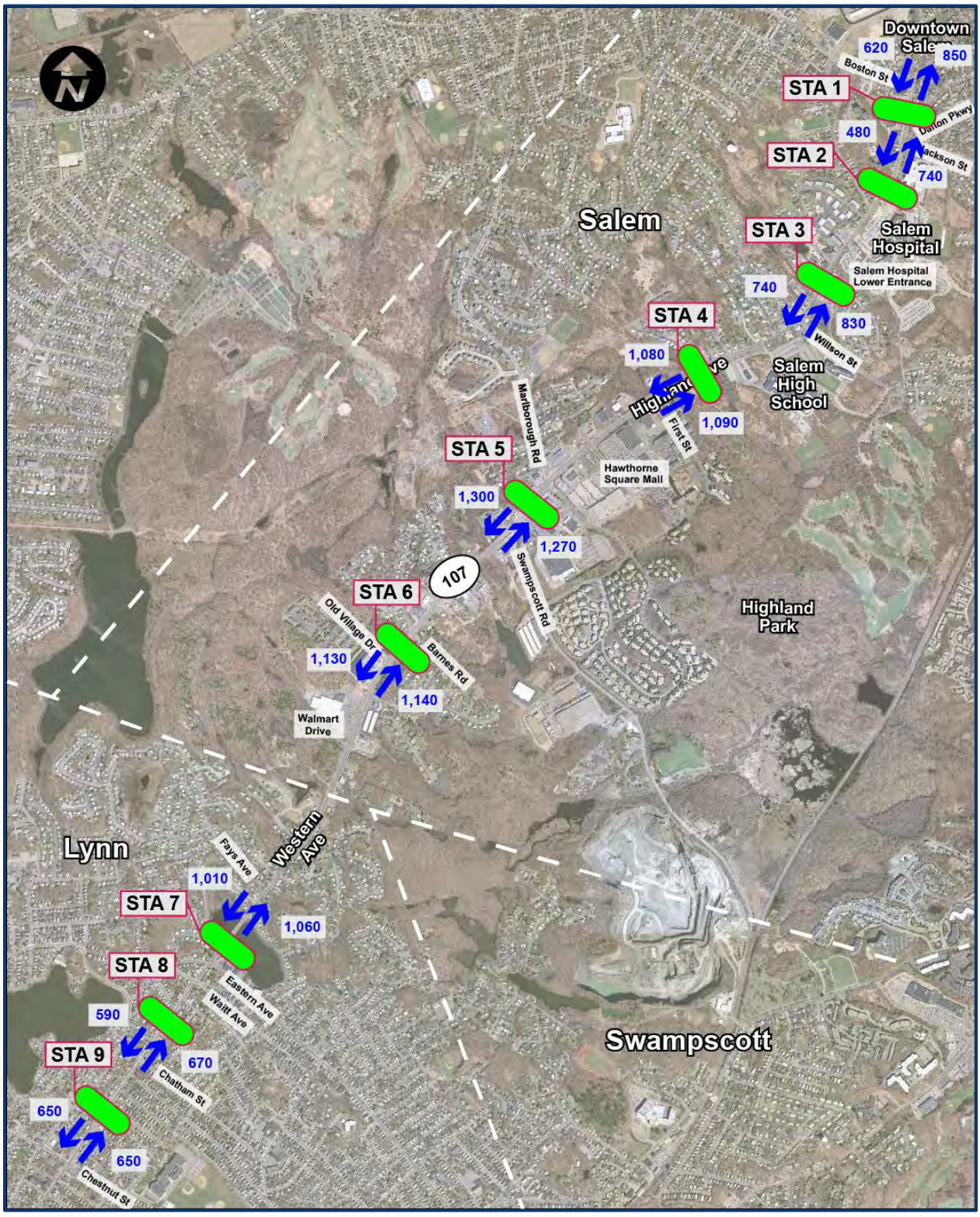


Figure II-9: Existing SAT Peak Hour Traffic Volumes

Each of the roadways listed above have a 24 hour exclusion on all vehicles 2.5 tons and over.

In addition to the vehicular volumes, pedestrian and bicycle volumes were also recorded. Pedestrian volumes are shown in Figure II-10 for the weekday morning, weekday afternoon, and Saturday midday pedestrian volumes occurring during the vehicular peak hour. Figure II-11 depicts hourly bicycle volumes for the weekday morning, weekday afternoon, and Saturday midday vehicular peak hours.

Figure II-10: Pedestrian Volumes

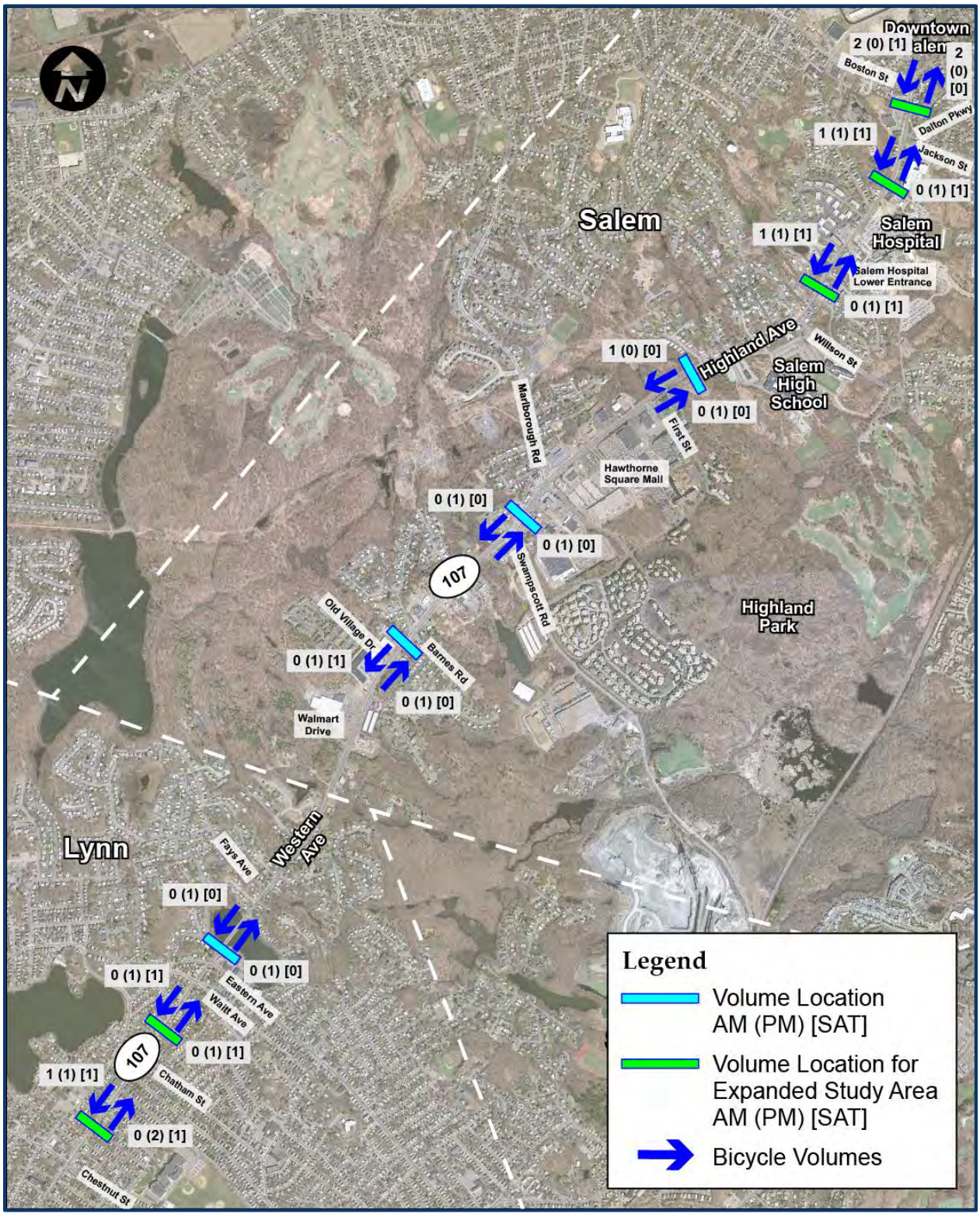


Figure II-11: Bicycle Volumes

Vehicle Speeds

Vehicle speeds were measured by the ATRs placed along Route 107. The speed limits within the study area range from 30 miles per hour to 45 miles per hour. Figure II-12 depicts the posted speed limits along Route 107 and 85th percentile speeds calculated at each of the ATR locations. The 85th percentile speed is the speed that 85 percent of the vehicles do not exceed, and is generally recognized as a reasonable speed for prudent drivers. In the southern and retail segments of the study area, the 85th percentile speeds were within reasonable range of the posted speed limits. In the northern segment of the study area, the 85th percentile speeds were found to be in excessive of 10 miles over the posted speed limits.

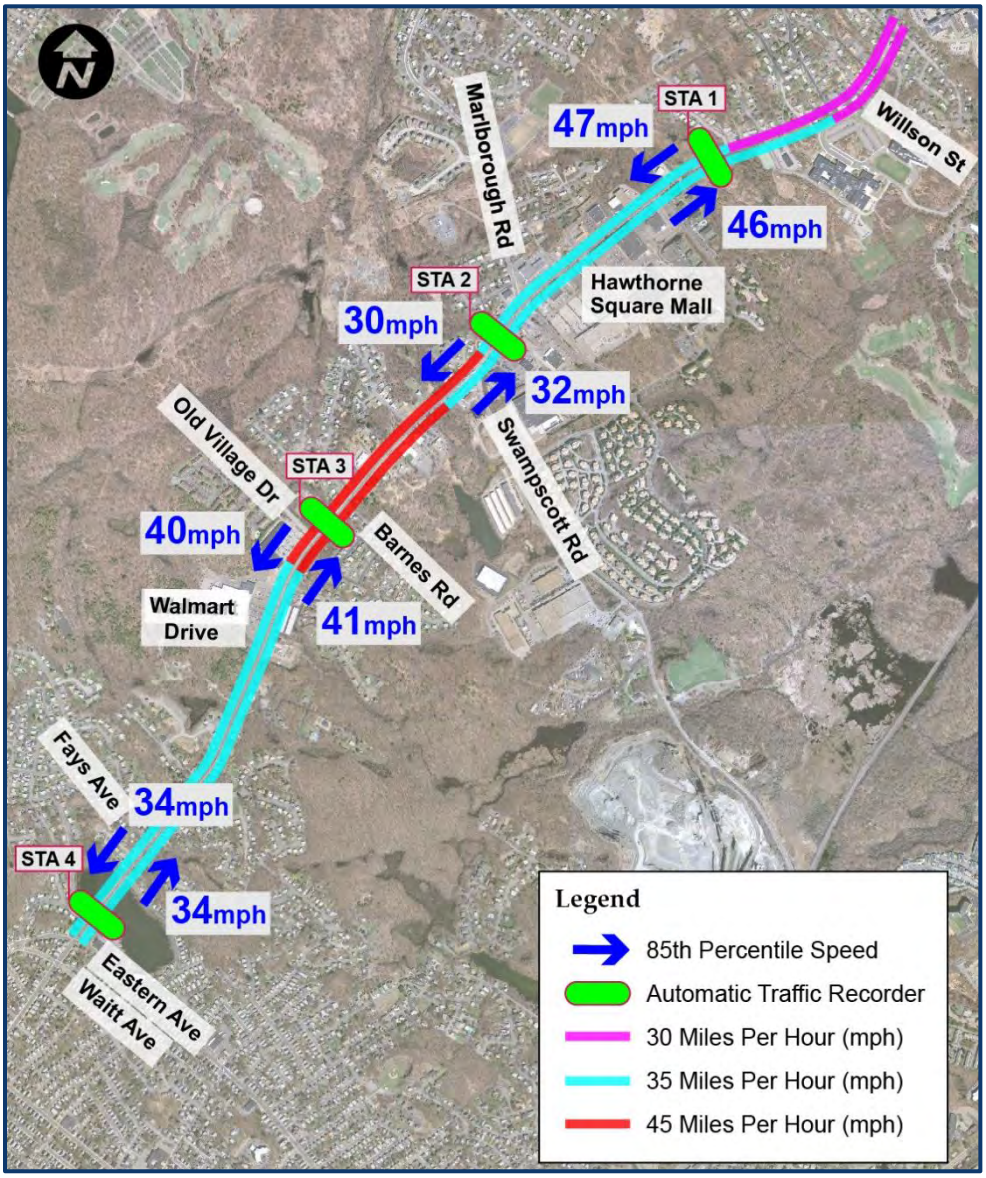


Figure II-12: Route 107 Weekday Speeds

Vehicle Queue Observations

Vehicle queue observations were completed at each of the 15 study area intersections during the weekday morning, weekday afternoon and Saturday midday peak periods. Queues measured in the field were then utilized to evaluate the results of the existing conditions capacity analysis. Minor modifications to the intersection capacity analysis were completed in order to more accurately reflect the field observed traffic operations.

Capacity Analysis

Intersection capacity analyses were completed as part of this study in order to review traffic flow at each of the study area intersections for the given travel demands. As a basis for this assessment, intersection capacity analyses were conducted using Synchro capacity analysis software for the study area intersections under the 2015 existing peak hour traffic conditions. The analyses are based on procedures contained in the 2010 Highway Capacity Manual (HCM) for the weekday morning, weekday afternoon and Saturday midday peak hours. Operating levels of service (LOS) are reported on a scale of A to F with A representing the best conditions (with little or no delay) and F representing the worst operating conditions (long delays). Typically LOS D and above are considered acceptable. More detail on the capacity/level of service analysis methodology is provided in the Appendix. As noted previously, the existing year capacity analyses were calibrated in order to more accurately reflect observed traffic operations in the field. Figure II-13 illustrates weekday morning, afternoon, and Saturday LOS at each study intersection.

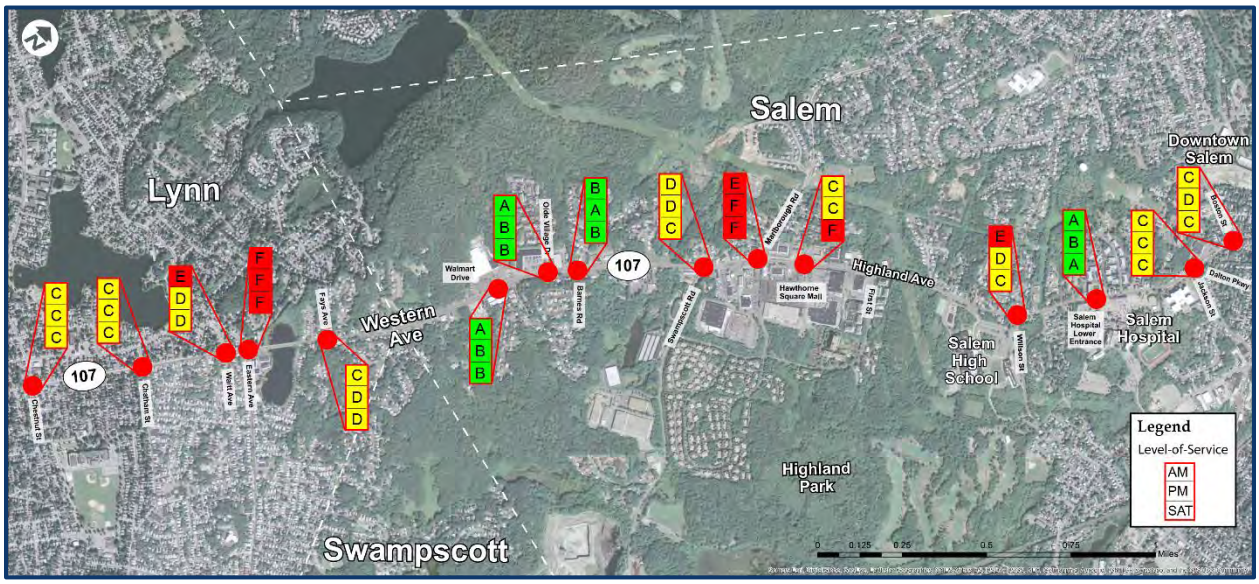


Figure II-13: Route 107 Intersection LOS

The detailed Synchro capacity analysis worksheets for the existing conditions are presented in the Appendix of this study. A full summary of capacity and queue analyses for each of the study area intersections during the weekday morning, weekday afternoon and Saturday midday peak hours are also presented in the Appendix for reference.

2. PEDESTRIAN ACCOMMODATIONS

The Route 107 study area is 3.7 miles long, providing for the potential of approximately seven miles of sidewalk, with sidewalk on each side of the road. Of the seven potential miles of sidewalk along Route 107, approximately two miles of roadway is currently not covered by sidewalk. The missing sidewalk is primarily on the western side of Route 107 adjacent to Walmart and north of the Hawthorne Square Mall Shopping Center. The average sidewalk width within the study area is five feet. The narrowest portion of clear space along the sidewalk is two feet in Salem, just east of the Lynn city line and the widest portion of the sidewalk system is ten feet in Lynn, between Chatham Street and President Street.

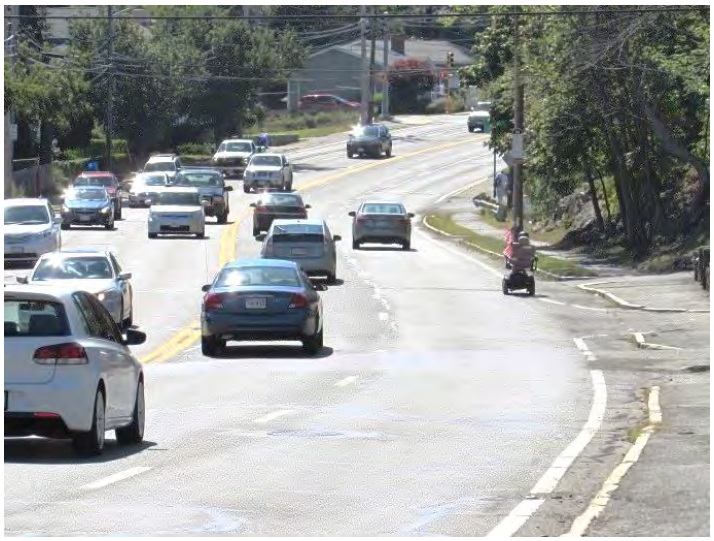


Image II.1: Sidewalks are so poor that wheelchair user opts to travel in the roadway, westside opposite Salem Hospital.

Pedestrians of all ages and abilities were observed traveling within the Route 107 roadway itself and not in a sidewalk area, presumably because of the width and/or poor condition of the sidewalk, as seen in Image II.1. There are several areas where the sidewalk is not well defined, and blends into driveways and abutting parking lots, enabling parked and moving vehicles to encroach upon the pedestrian realm, as seen in Image II.2. There are many examples of locations where there is a lack of definition between pedestrian space and vehicular space such as in the vicinity of the following Salem locations: Tropical Products at 220 Highland Avenue, Highland Avenue Auto Body at 455 Highland Avenue and 86 Highland Avenue. There are also several abandoned curb cuts, including one at the Salem Hospital parking lot. Another recurring condition throughout the study

Image II.2: Vehicles parked across driveway entrance, impeding pedestrian travel outside Highland Ave Auto Body.

Image II.3: Long pedestrian crossing with no refuge island, or pedestrian signal heads, at entrance to Target/Market Basket.

area is the presence of debris on sidewalks. The debris is often an obstruction to pedestrians and contributes to the lack of a pedestrian-oriented environment.

Image II.4: Elevated pedestrian crossing northbound approaching pedestrian bridge at school.

Pedestrian crossings within the study area are varied. Crosswalks are intermittently provided throughout the study area, but there is generally a lack of crosswalks across the side street approaches to Route 107. There are also several pedestrian crossings that are long; requiring pedestrians to cross four to five lanes of traffic without refuge and without appropriate pedestrian control, as is seen in Image II.3, at the entrance to Hawthorne Square Mall Shopping Center. Where crosswalks do exist within the study area, many of the curb ramps associated with the crosswalks are either in poor condition or missing entirely. There is one elevated pedestrian crossing just north of Crowdis Street next to Salem High School, shown in Image II.4.

Pedestrian volumes at select sites within the study area are shown in Figure II-14.

Figure II-14: Pedestrian Volumes Along the Corridor

3. BICYCLE ACCOMMODATIONS

In general, bicycle facilities within the study area are lacking. Although some sections of the study area contain wide shoulders where bicyclists may travel, there are no designated bicycle amenities. The lack of bicycle amenities causes bicyclists to utilize the sidewalk, as shown in Image II.5. Bicycle signal actuation signs are provided at several intersections. These signs instruct bicyclists to wait on the bicycle symbol pavement marking to request a green indication.

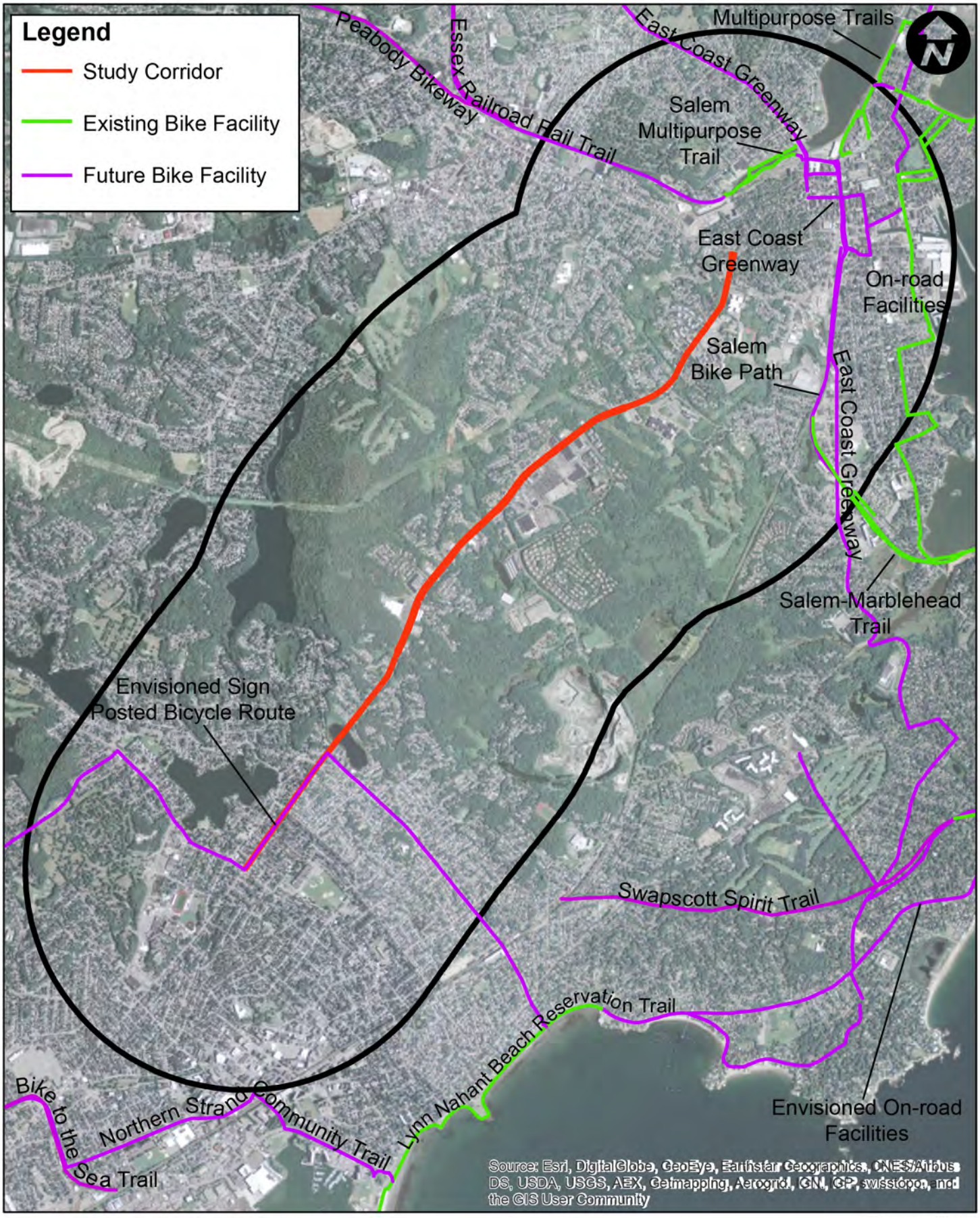
Image II.5: Bicyclists riding on the sidewalk, eastside north of Chestnut.

The northern end of the study area in Salem contains the majority of bicycle facilities in the study area. The City of Salem has both multiuse trails and on-road bicycle facilities. All public roads in Salem can be used as a shared route facility except for the Essex Street Pedestrian Mall between Washington and Liberty Streets in downtown Salem. A recommendation of the 2010 Bicycle Circulation Master Planning Study is for the City of Salem to continue improving multiuse paths and on street bicycle facilities.[2]

The existing and future bicycle facilities within and in close proximity to the study area are depicted in Figure II-15. The map illustrates the existing bicycle infrastructure on the northern end of the study area in Salem, and the lack of bicycle infrastructure surrounding the study area in Lynn. Route 107 is located between existing, and envisioned bicycle facilities, making it a major gap in the regional bicycle network. The existing infrastructure includes:

- Lynn Nahant Beach Reservation Trail (shared use path), to the southeast,
- East Coast Greenway/Independence Greenway Path (shared use path), in Peabody, to the northwest (completed segments not pictured), and
- Salem-Marblehead Trail
- Several on-road bicycle lanes and multipurpose trails in downtown Salem to the north east.

[2] Bicycle Circulation Master Planning Study, Fay, Spofford & Thorndike and Salem Bike Path Committee, 2010



ROUTE 107 Lynn Salem Corridor Study

0 0.25 0.5 1 Miles

Figure II.15
Existing and Future Regional Bicycle Network
Route 107 Corridor Study
Lynn and Salem, Massachusetts

Bicycle trails that are in the planning stages and envisioned for the future include:

- Bike to the Sea Trail
- Northern Strand Community Trail
- Swampscott Spirit Trail
- East Coast Greenway through Salem
- Essex Railroad Rail Trail
- Peabody Bikeway

Lincoln Avenue and Parkland Avenue, in Lynn, are envisioned to be sign-posted bicycle routes that would directly connect Route 107 to the regional bicycle network via Route 129A/Eastern Avenue. Route 107 would be connected to regional trails connecting Lynn to Marblehead and Salem to Peabody.

The Bike to the Sea/Northern Strand Community Trail runs through Everett, Malden, Revere Saugus, and Lynn. The construction of the trail is almost complete, except for the connection in the City of Lynn. The Northern Strand Trail Communities Bicycle and Pedestrian Network Plan prioritizes the completion of this trail, as well as bicycle connections from the trail to major destinations such as schools, central retail districts, and other off-road trails.[3] Currently, there are many gaps in the Lynn bicycle network. The plan identifies the following roadway segments in Lynn that could incorporate a cycle track:

- Boston Street (Ford Street to North Franklin Street)
- Boston Street (Saugus line to Cottage Street)
- Broad Street (Nahant Street to Chestnut)
- Commercial Street (Alley Street to Bennett Street)
- Hanover Street (Chase Street to North Common Street)
- Neptune Boulevard (Blossom Street to Commercial Street)

Bicycle volumes within the study area are shown in Figure II-16.

[3] Northern Strand Trail Communities Bicycle and Pedestrian Network Plan, July 2013

Figure II-16: Bicycle Volumes Along Corridor

4. TRANSIT CONDITIONS

Bus Routes and Service:

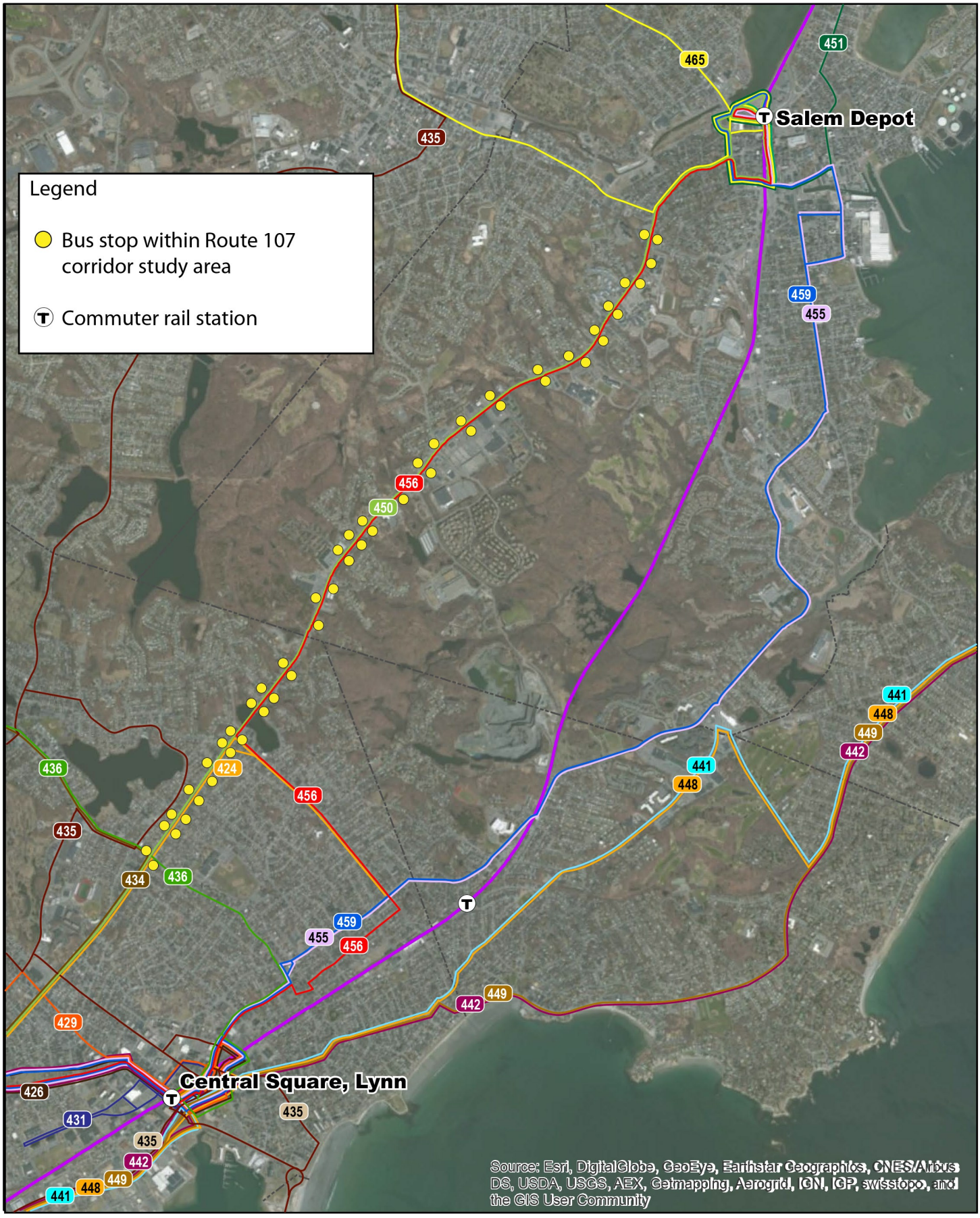
Four MBTA bus routes run along Route 107, within the study area, including routes 424, 434, 450 and 456, as shown in Figure II-17. In addition, Route 436 traverses the study area at Chestnut Street in Lynn. Image II.6 displays Route 456 serving the study area in Salem. The MBTA bus route maps and timetables for these routes are included in the Appendix. Inbound transit rides along Route 107 are traveling southbound and outbound rides are traveling northbound. The ridership data collected for this study is current as of fall 2014.

Image II.6: Route 456

Route 424 provides limited service operating from Lynn to Wonderland Station in Revere during the weekday morning peak period, and from Haymarket Station in downtown Boston to Lynn during the weekday afternoon peak period. The average weekday ridership (combined boardings and alightings) on the route was 286 inbound and 183 outbound. Route 424 runs every 30 minutes during the weekday peak period in the morning from 5:50 AM to 8:35 AM and in the afternoon from 4:10 PM to 6:35 PM. The route operates to/from Eastern Avenue and Essex Street in Lynn, and along Western Avenue in the southerly end of the study area.

Route 434 runs once per weekday in each direction, between Peabody Square in Peabody, and Haymarket Station, along Western Avenue south of Chestnut Street. The average weekday ridership on the route was 62 inbound and 48 outbound. The outbound bus stop on Route 107 is nearside of Chestnut Street, meaning that it is located along Route 107 south of Chestnut Street. The inbound bus stop is located on Route 107 north of Chestnut Street. The inbound trip leaves Peabody Square at 6:45 AM and arrives at Haymarket Station at 8:00 AM. The outbound trip departs Haymarket Station at 5:20 PM and arrives at Main Street in Peabody at 6:30 PM.

Route 436 operates between the Lynn Commuter Rail Station and the Liberty Tree Mall in Danvers, traversing Route 107 at the southerly end of the study area on Chestnut Street. Over the course of a typical weekday, approximately 270 riders travel inbound and 355 riders travel outbound. On Saturdays approximately 134 riders traverse Route 107 inbound, and 223 riders travel outbound. Route 436 operates every 20 minutes during the weekday peak periods and every 60-75 minutes during the off-peak periods. The first trip departs Central Square in Lynn at 6:10 AM and the last trip departs the Liberty Tree Mall at 6:40 PM. The route also provides Saturday service from 6:20 AM to 7:15 PM, with service approximately every 70 minutes.



ROUTE 107 Lynn Salem Corridor Study

0 0.55 1.1 Miles

Figure II.17
Transit Overview
Route 107 Corridor Study
Lynn/Salem, MA

Route 450 provides a more comprehensive regional connection between Boston and the North Shore, running between Haymarket Station in downtown Boston or Wonderland Station in Revere, and the Salem Commuter Rail Station, in downtown Salem. The average weekday ridership on the route is 1,639 inbound and 1,816 outbound. During the weekday peak period, Route 450 provides service every 30 minutes, and during the off-peak service Route 450 operates every 80 minutes. Weekend service generally runs hourly, from 6:30 AM to 12:30 AM on Saturdays, and from 8:30 AM to 11:50 PM on Sundays.

Route 456 provides a local connection between Salem and Lynn, running between the Salem Commuter Rail Station and the Lynn Commuter Rail Station. The average weekday ridership on the route is 230 inbound and 318 outbound. Route 456 provides limited service, only running on weekdays during the daytime. Buses run every 80 minutes, with the first bus departing from Western Avenue, opposite the MBTA Lynn Bus Garage, at 6:52 AM and the last bus departing the Lynn Commuter Rail Station at 3:35 PM. The first bus departs the Salem Commuter Rail Station at 9:40 AM and the last bus departs at 4:20 PM. The combined routes 450 and 456 provide service every 40 minutes during the weekday midday period, throughout the study area.

A summary overview of the predominant bus routes servicing Route 107 within the study area is provided in Table II.2 below.

Table II.2: Route 107 Primary Bus Service Overview

<table>
<tr><th colspan="2"></th><th>MBTA Route 424 Eastern Ave. /Essex St. - Haymarket or Wonderland</th><th>MBTA Route 450 Salem Depot- Haymarket</th><th>MBTA Bus Route 456 Salem Depot- Central Sq. Lynn</th></tr>
<tr><td colspan="2">Average Weekday Ridership (Fall 2014)</td><td>240</td><td>1,734</td><td>275</td></tr>
<tr><td colspan="2">Span of Service (weekday)</td><td>5:50 AM – 6:35 PM</td><td>4:45 AM – 1:30 AM</td><td>7:00 AM – 5:00 PM</td></tr>
<tr><td rowspan="3">Frequency</td><td>Peak</td><td>30 minutes</td><td>30 minutes</td><td rowspan="2">80 minutes</td></tr>
<tr><td>Off-Peak</td><td>n/a</td><td>80 minutes</td></tr>
<tr><td>Combined</td><td>-</td><td colspan="2">40 minutes mid-day on Route 107 corridor</td></tr>
</table>

Bus Stop Ridership

Bus routes 450 and 456 service the same stops along Route 107 from Warren Street at the northern end of the study area to Waitt Avenue at the southern end. Bus routes 424 and 450 service the same stops along Route 107 at the southern end of Route 107 between North Maple Street and Chestnut Street, as shown in Figure II-17.

As of Fall 2015, there were 52 bus stops along the study area, 25 inbound stops and 27 outbound stops[4]. Bus stops are spaced between 287 feet and 1,486 feet of one another. The average spacing within the study area is 790 feet on the west side and 730 on the east side. The longer bus stop spacing is located within segments with few side streets and minimal land-use activity.

Figure II-18 summarizes bus stop boardings and alightings, and the distance between stops. The boardings and alightings for the top five bus stops in the study area are listed in Table II.3.

Table II.3: Ridership at Top Five Bus Stops in the Corridor

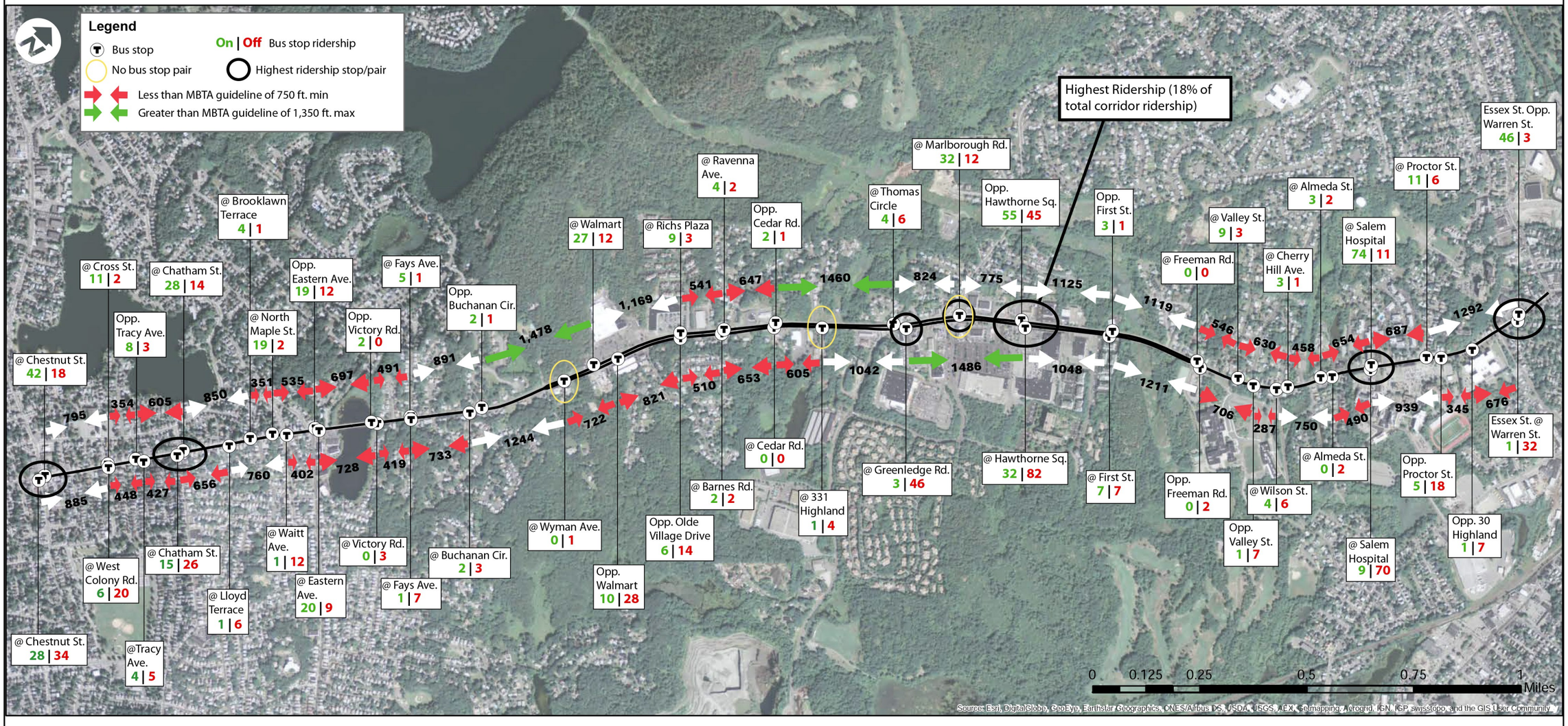
Top Five Bus Stops		
Stop Location	Boardings & Alightings	
	Inbound	Outbound
1. Hawthorne Square	100	114
2. Salem Hospital	85	79
3. Western Ave/Chestnut St	60	62
4. Marlborough Rd/Greenledge Rd	44	49
5. Western Ave/Chatham St	42	41
Total Top Five Ridership	331	345
Total Ridership on Corridor	585	615
Percent Top Five Ridership	57%	56%

The majority of bus stops have low ridership, with many stops having less than 20 daily trips. The stops with the highest ridership are the pair of stops at the Hawthorne Square Mall Shopping Center, which represent 18% of total study area boardings. Low ridership at several bus stops is likely a result of limited pedestrian access to/from and through the study area, and limited transit-trip generating land uses. These access deficiencies will be discussed in the following section.

Commuter Rail

The MBTA Newburyport/Rockport Commuter Line runs parallel and approximately one mile to the east of Route 107, as shown in Figure II-17. Although there are no stations within the study area, there are three stations along the line that indirectly serve the populations near the Route 107 study area. These include Lynn Station 1.5 miles to the south, Swampscott Station 1.2 miles to the southeast, and Salem Station 1 mile to the north. Each of these stations provide direct access to North Station, in downtown Boston. The stations can be accessed via the bus routes on Route 107.

[4] Following correspondence with MBTA in July 2015, the bus stop located nearside of Cain Road that was observed in the field, but did not exist in MBTA records, was removed, in addition to the Clark Street outbound stop.



ROUTE 107 Lynn Salem Corridor Study

Figure II.18
Existing bus stop ridership and spacing
Route 107 Corridor Study
Lynn/Salem, MA

C. CRASH ANALYSIS

1. MASSDOT DATA

Crash data for the study area intersections was obtained from MassDOT for the most recent five-year period available. This data includes complete yearly crash summaries for the years 2008-2012. A summary of the crash data at each of the study area intersections is provided in the Appendix of this study. Although a majority of the crashes in the study area involved motor vehicles only, there were five accidents that involved a bicyclist, with one at Route 107 and Chatham Street, two at Route 107 and Maple Street/Waitt Avenue, and two at Route 107 and Willson Street. Nine pedestrian-related accidents were recorded during this time period within the study area, with four at Route 107 and Chestnut Street, one at Route 107 and Chatham Street, three at Route 107 and Marlborough Road/Traders Way, and one at Route 107 and Boston Street.

The MassDOT Crash Rate Worksheet was used to determine whether the crash frequencies at the study area intersections were unusually high given the vehicular volumes at each location. The MassDOT Crash Rate Worksheet calculates a crash rate expressed in crashes per million entering vehicles. The calculated crash rate was then compared to the average crash rate for signalized and unsignalized intersections within Massachusetts. The average crash rate for MassDOT District 4, in which the study area resides, is 0.77 crashes per million entering vehicles for signalized intersections and 0.58 crashes per million entering vehicles for unsignalized intersections. The statewide average crash rate is 0.80 crashes per million entering vehicles for signalized intersections and 0.60 crashes per million vehicles for unsignalized intersections. A comparison of the individual crash rates for each of the study area intersections with the statewide average crash rates is depicted in Figure II-19 below.

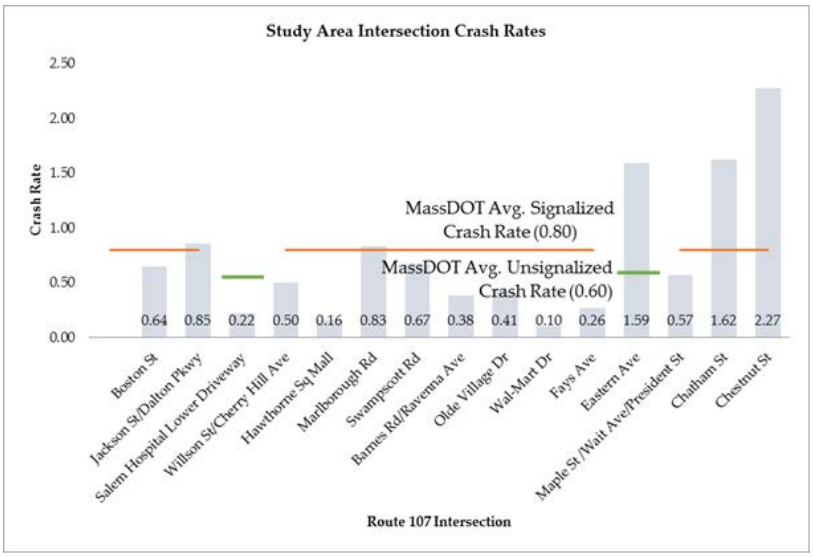


Figure II-19: Study Area Intersection Crash Rates

Within the area of study, there are five intersections with crash rates exceeding the MassDOT District 4 and statewide averages:

- Route 107 at Chestnut Street
- Route 107 at Chatham Street
- Route 107 at Eastern Avenue/Stanwood Street
- Route 107 at Marlborough Road/Traders Way
- Route 107 at Jackson Street/Dalton Parkway

As shown in Figure 2.20 each of the remaining study area intersections experienced a crash rate below both the MassDOT District 4 and statewide averages for signalized and unsignalized intersections. Intersections with a crash rate below the MassDOT District 4 and statewide averages are not considered to have significant safety deficiencies.

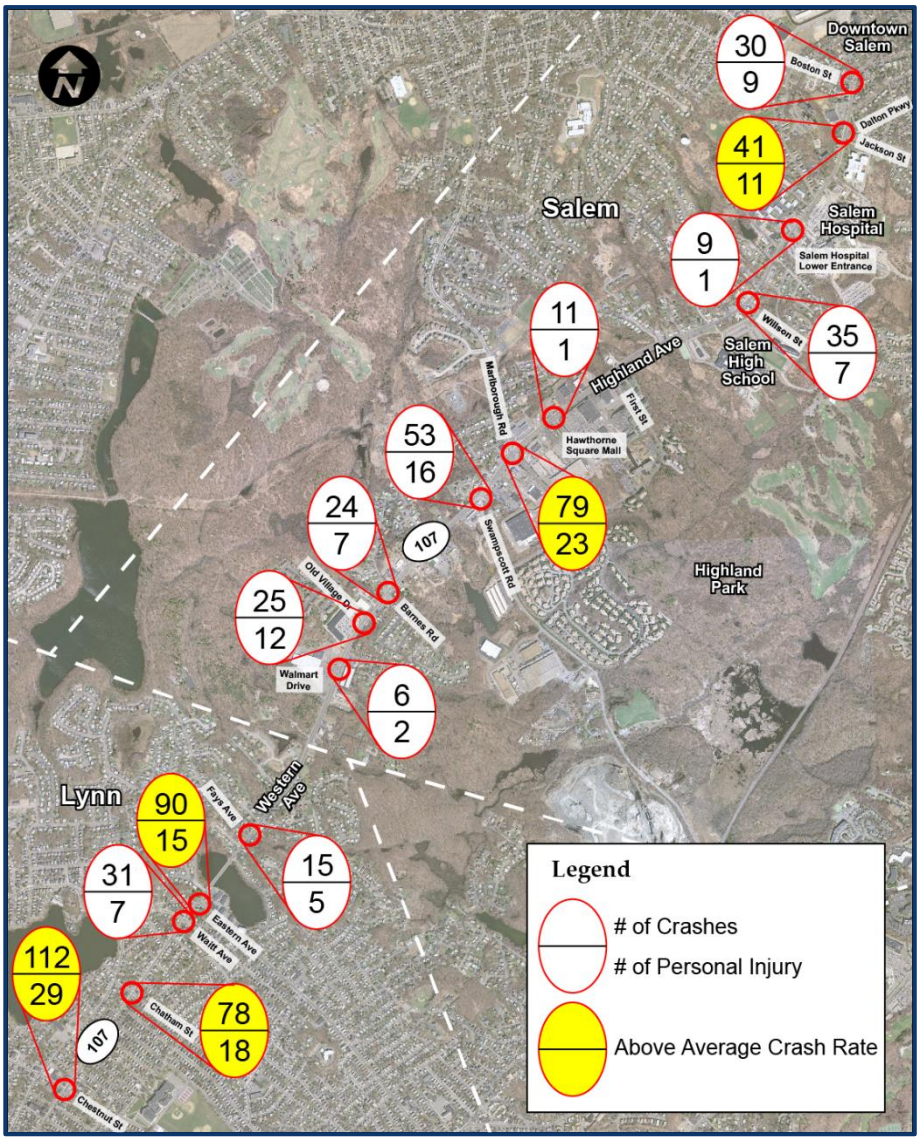


Figure II-20: Intersection Crash Rates

Of the five high crash rate locations, four of the intersections were also identified as Highway Safety Improvement Program (HSIP) intersections for 2011-2013. Under HISP, high crash locations are targeted for safety improvements, with particular emphasis on locations with fatal and injury crashes. The four locations include the intersection of Route 107 with Chestnut Street, Chatham Street, Eastern Avenue, and Marlborough Road. Crash reports were obtained from the local police departments for these four intersections to identify trends and patterns of the crashes at each location. Further review of these four locations is discussed below.

2. LOCAL POLICE DATA

Crash reports were obtained from both the Lynn and Salem police departments for the following HSIP and high crash rate intersections:

- Route 107 at Chestnut Street
- Route 107 at Chatham Street
- Route 107 at Eastern Avenue/Stanwood Street
- Route 107 at Marlborough Road/Traders Way

The narratives and details of the crash reports obtained from the police departments were reviewed to identify specific trends and patterns at each of the intersections noted above. The local data from Salem covered the five year period from 2008 to 2012 and the Lynn data covered from 2009-2013. Crash diagrams were created for each of the locations based on the crash reports and are provided in the Appendix of this study.

Route 107 at Chestnut Street

Based on the local crash reports, 82 crashes were reported by the Lynn Police Department at the intersection of Route 107 and Chestnut Street during the five-year period analyzed. As seen in the crash diagram provided in the Appendix, many of the crashes at this location were reported as angle or rear-end crashes. Traffic congestion is the most likely contributor to rear-end crashes, while a number of existing safety deficiencies may contribute to the angle crashes at the intersection. Insufficient clearance intervals and lack of exclusive left-turn lanes may be leading to the angle crashes.

Route 107 at Chatham Street

54 crashes were reported by the Lynn Police Department at the intersection of Route 107 and Chatham Street between 2008 and 2012. Similar to the intersection of Route 107 at Chestnut Street, approximately 41% of the locally reported crashes were angle collisions. Based on the summaries provided in the police reports, many angle collisions occurred as a result of left-turning vehicles misjudging the gap in traffic or vehicles driving in the opposite direction switching lanes to travel around vehicles making a left turn. The second highest type of crash was a rear-end crash, with approximately 37% of the total crashes being reported as rear-end. The majority of the rear-end collisions occurred on the northbound and southbound Route 107 approaches to the intersection.

Route 107 at Eastern Avenue/Stanwood Street

The unsignalized intersection of Western Avenue and Eastern Avenue experienced 82 locally reported crashes during the five-year period of analysis between 2009 and 2013. The offset approaches of Stanwood Street and Eastern Avenue is a major safety issue for this location. Available sight distance for both the eastbound and westbound stop controlled approaches is insufficient, contributing to a number of crashes for vehicles exiting Stanwood Street and Eastern Avenue. Crashes in the southbound direction on Route 107 are likely attributed to the southbound left turn movement causing conflict with northbound traffic or blocking the southbound lane resulting in rear-end collisions.

Route 107 at Marlborough Road/Traders Way

The Salem Police Department reports indicated that there were 47 reported crashes at the intersection of Route 107 with Marlborough Road and Traders Way during the five-year period analyzed. The majority of the crashes at this intersection were rear-end collisions resulting in property damage. The extensive queues and congestion experienced at this intersection may be the cause of the high number of rear-end collisions both approaching and departing the intersection. The second highest occurrence of crash were angle collisions (approximately 19%) primarily involving the westbound left-turn from Traders Way.

Based on the safety analysis completed as part of this study, a number of signal and geometric improvements can be implemented at the intersections with safety deficiencies. Subsequent chapters of this study document potential safety improvements in detail.

D. DEMOGRAPHICS

Salem and Lynn contain major destinations in the North Shore region. Demographic factors affect the travel behavior and demand on and surrounding the study area. An understanding of the existing demographic characteristics of the study area, including population and, environmental justice communities help inform the development of study area alternatives.

1. POPULATION

According to the 2010 US Census, the City of Lynn has a population of 90,329, making it more than twice as large as the City of Salem, with a population of 41,340. Lynn is projected to experience a population growth of 25%, to 112,884 people, while Salem is projected to experience population growth of 15%, to 47,720 people, by the year 2035.[5]

[5] Massachusetts Population Projections, UMass Donahue Institute Population Estimates Program

The study area has a population of approximately 111,450 people and includes 43,650 households.[6] The study area's inclusion of relatively densely populated study areas of Salem and Lynn to the north and south of the Route 107 study area account for the relatively large study area population, compared to each municipalities' total population. Population, household, and employment data for the study area, City of Salem, and City of Lynn, is summarized in Table II.4.

In both municipalities one and two-person households make up over 50% of households. Out of approximately 47,000 housing units, 93% are occupied and 7% are vacant. Of the occupied units, there is an even split between those owner occupied and those rented. The study area has a fairly even age distribution. The largest cohorts are 20 to 24 and 25 to 29 years (8% of population each), and smallest cohorts are 65 to 69 and 70 to 74 years (3% of population each). The age breakdown of the study area is illustrated in Figure II-22.

The majority of the population in the study area is white, non-Hispanic, at 61%, while persons of Hispanic ethnicity comprise 25% of the population, as seen in Figure II-21.

Table II.4: Population, Households, and Employment along the Study Area

	Study Area		
	Total[7]	Within Salem	Within Lynn
Average Population			
2010 Census	111,450	39,250	55,600
2040 Projection	122,400	43,000	61,300
Growth 2010-2040	10%	9%	10%
Average Households			
2010 Census	43,650	16,900	20,100
2040 Projection	51,850	19,650	24,000
Growth 2010-2040	19%	17%	19%
Employment			
2010 Census	34,800	17,100	14,200
2040 Projection	37,400	19,550	14,350
Growth 2010-2040	7%	14%	1%

Source: Central Transportation Planning Staff Demographic Profile and TAZ data based on 2010 Census and projections based on MassDOT's State Community Control Totals for population and employment forecasts based on the Donahue Institute and MAPC.

[6] CTPS Demographic Profile TAZ level data based on 2010 U.S. Census and projected based on MassDOT's State Community Control Totals for population and employment forecasts based on the Donahue Institute and MAPC.

[7] Total study area also includes population, household and employment data from areas of Swampscott and Peabody that fall within the one-mile study area.

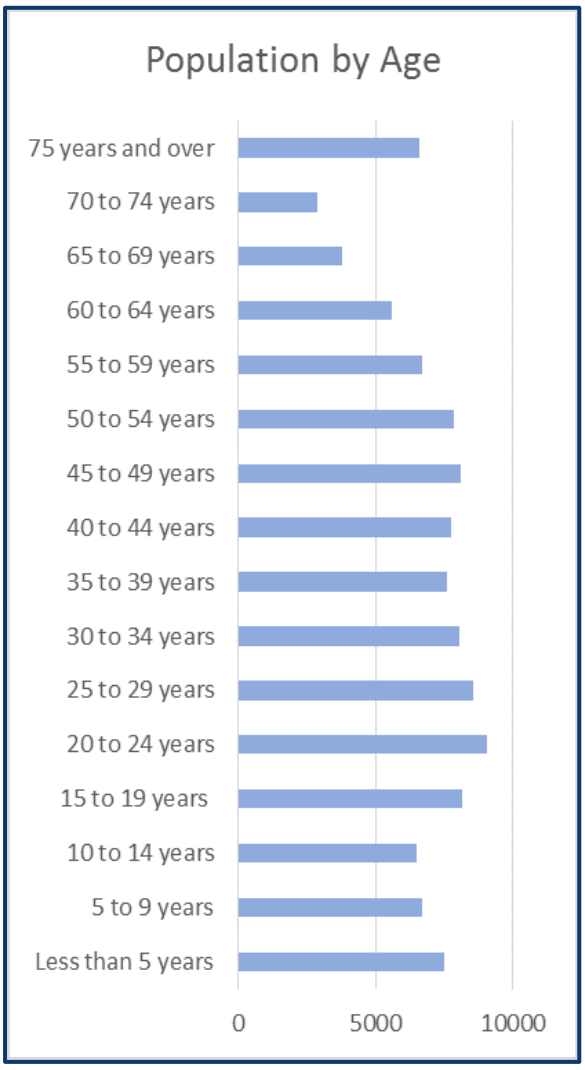


Figure II-22: Population by Age Chart

Overall, the City of Lynn has larger Hispanic and Black or African American populations, suggesting the study area is slightly less diverse than the City of Lynn as a whole, but more diverse than Salem as a whole.

The median household income in Salem and Lynn in 2010 was $56,979 and $43,200 respectively. Salem had an unemployment rate of 8.3% and Lynn had an unemployment rate of 9.7%. The vast majority of workers in both communities commute by car truck or van, 95% in Salem and 83% in Lynn. Most residents in both communities have one vehicle available, with 24% of households in Salem and 21% in Lynn having no vehicle available.[8]

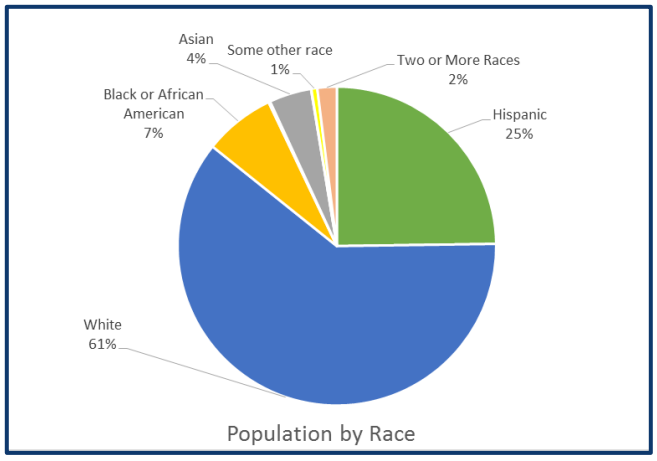


Figure II-21: Population by Race Chart

2. ENVIRONMENTAL JUSTICE

Executive Order 12898, "Federal Actions to Address Environmental Justice (EJ) in Minority Populations and Low Income Populations" of February 11, 1994 lays the groundwork for the Boston Region Metropolitan Planning Organization's (MPO) transportation equity program. The program insures that EJ populations are provided equal opportunity to participate in the transportation planning and decision–making process. It also insures that EJ populations share equitably in the benefits and burdens of transportation projects and services. Engaging EJ populations in transportation decisions is important, as historically low-income and minority

[8] 2010 U.S. Census

populations have experienced many negative effects and few benefits of transportation projects. Involving EJ communities helps to avoid, minimize, or mitigate disproportionate adverse health and environmental effects on these populations.

The Boston Region MPO defines Environmental Justice communities for analysis and outreach purposes. It measures environmental justice populations at the transportation analysis zone (TAZ) level and defines criteria for both the minority and low-income thresholds. These areas are defined where a cluster of TAZs contain a non-white or Hispanic population that is greater than 27.8% and/or when a population's income is less than 60% of the MPO Region's median household income ($42,497 in 2010). Since Lynn and Salem are within the Boston Region MPO, the same definition of EJ populations was used for consistency in the transportation planning process.

Within the study area there are several defined Environmental Justice populations, yet only one abuts the Route 107 study area, as show in Figure II-23. This population is located on the southern end of the study area in East Lynn and meets the minority threshold. Further south towards Central Square in Lynn there is an identified Environmental Justice population that meets both the minority and income thresholds. On the northern end of the one-mile study area east of downtown Salem there is a small area meeting the income threshold and a small area meeting both the income and minority thresholds. There is also a low-income neighborhood in Peabody that touches the northwest border of the one-mile study area.

E. LAND USE AND ZONING

1. LAND USE

Land uses within the study area are depicted in Figure II-24. The study area within Lynn is primarily residential, with the majority of residences being either multi-family or high density housing. Residential land classified as high density includes housing located on lots of ¼ an acre or less.[9] The residential area of Lynn contains a few institutional and commercial uses interspersed throughout, which are mainly schools and retail stores.

The northern end of the Route 107 study area in Salem, is a mix of residential, commercial, and institutional uses. Major institutions include the Salem Hospital, Salem High School, and Collins Middle School. Opposite these uses is a residential neighborhood with a mix of high density and multi-family residential homes. There is also open space on either side of the study area within a mile radius.

[9] MassGIS Land Use data (2005)

III. DEFICIENCIES

A. STUDY AREA

Deficiencies in the study area were cataloged as study area-wide deficiencies and intersection-related deficiencies. The deficiencies, noted for each mode of traffic, were identified based upon field reviews, data collection and operational analysis. Following are the descriptions of study area-wide deficiencies by transportation mode.

1. PEDESTRIAN

Overall the Route 107 study area does not provide adequate pedestrian facilities. Maintenance is generally lacking, in terms of striping of pedestrian crosswalks, overgrowth on the sidewalk or from abutting properties, and debris. The following pedestrian deficiencies are noted within the study area and further described below:

- Missing sidewalks
- Poor condition of existing sidewalks including cracked pavement, debris, and obstructions
- Lack of buffer between the travel way and the pedestrian walkways
- Poor curb reveal which minimizes the vertical separation between pedestrians and motor vehicles
- Lack of crosswalks
- Lack of curb ramps
- Obstructions in walkways
- Poor signage relative to crosswalks
- Lack of accessible pedestrian signals
- Missing sidewalks and crosswalks reduce pedestrian connectivity at desire lines and at bus stops

Image III.1: Degraded sidewalk at 233 Western Ave.

Despite the presence of sidewalks along the majority of the Route 107 study area, there are large gaps in the sidewalk network, particularly on the western side adjacent to Walmart and Highland Place, between Cain Road and Ravenna Avenue. Of the approximately six miles of sidewalk, approximately two miles is considered good, approximately 2.5 miles is considered fair, and approximately 1.5 miles is considered poor. Good sidewalk conditions have few, if any, cracks and a level surface. Fair sidewalk conditions have some cracking, and may be patchy and uneven. Poor sidewalk conditions are characterized by cracking, are covered in debris, and have a low or no curb reveal between the sidewalk surface and the travel way. Typically a six inch curb reveal is desirable between the sidewalk area and the travel way. Sidewalks within driveways are particularly poor in several locations, such as at 233 Western Avenue in Lynn, as shown looking northerly in Image III.1.

The absence of curb ramps, both at crosswalks and driveways, also contributes to the sidewalk's discontinuous nature. Several intersections have some form of curb ramp connection, between the sidewalk and the roadway, but they are typically too narrow and do not conform to the requirements of the Americans with Disabilities Act (ADA) requirements. An example is shown in Image III.2, at the northeast corner of the intersection of Route 107 with the Salem Hospital. Other curb ramps are severely degraded and have cracks within and/or on the approach to the ramp, as seen in Image III.3 Obstructions on the sidewalk, such as utility poles, signal cabinets, fire hydrants, emergency call boxes, and street trees, narrow the pedestrian path of travel to less than a desirable 4 foot minimum clear space or to the extent that ADA requirements are not met, as illustrated in Image III.4, which was taken looking north at the intersection of Route 107 and Walmart and Image III.5, which is taken on the northbound side of Route 107, north of Willson Street. There is an overall lack of buffers as only approximately 0.12 miles of sidewalk have a grass buffer between the sidewalk and the street. The buffer occurs intermittently along Route 107 between Waitt Avenue and Dalton Parkway. There is also a lack of standard curb reveal, and features like street trees, which put pedestrians in close proximity to the busy roadway, as Image III.6 illustrates. Image III.7 shows how a small stretch of sidewalk, on the west side of Route 107, opposite of the Salem Hospital is terraced, with no protection or warning signs.

Image III.2: Narrow ramp (3') at entrance to Salem Hospital.

Image III.3: Crumbling curb ramp - eastside, north of Chestnut.

Image III.4: Utility pole in the middle of a narrow sidewalk, opposite Walmart driveway.

Image III.5: Tree pit narrows soutwest to 2'.

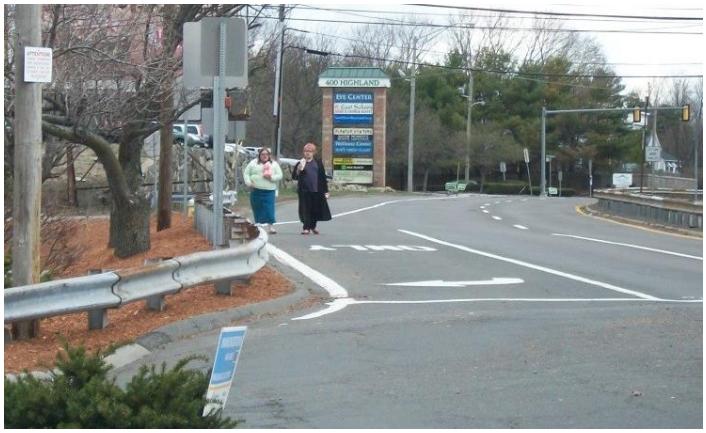


Image III.6: Pedestrians walking in the roadway due to the absence of a sidewalk (Pedestrians observed crossing the median from Dunkin Donuts to Walmart) west side South of Olde Village Pl.'

Image III.7: Terraced sidewalk – westside, north & opposite Salem Hospital driveway.

Of the crosswalks along the study area, most are not well signed. Pedestrian crossing signs are either non-existent, or signs are faded and do not conform to MassDOT standards. The lack of pedestrian facilities at longer pedestrian crossings with high traffic volumes, such at the entrance to Hawthorne Square Mall Shopping Center, presents safety issues. This location lacks a pedestrian refuge island and signalized crosswalk, both of which would aid in safe pedestrian crossings. In addition, there are no Accessible Pedestrian Signals at any intersections in the study area. Sidewalk characteristics and deficiencies are detailed in a series of sidewalk maps provided in the Appendix. An example of the deficiency maps is provided in Figure 3.1.

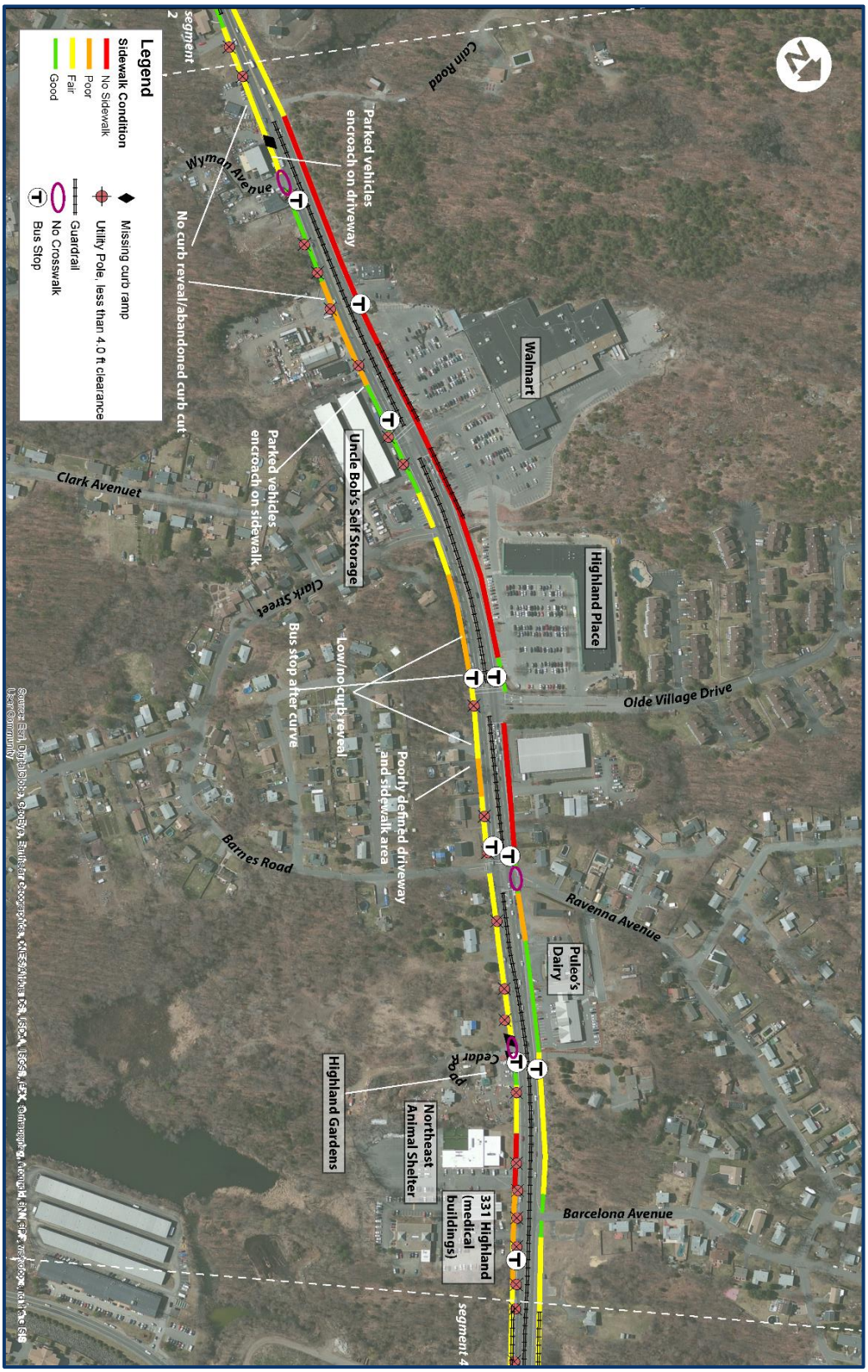


Figure III-1: Example of deficiency - Segment 3

2. BICYCLE

As discussed in the existing conditions sections, the entire study area lacks bicycle lanes or on-road bicycle markings. There is also a lack of connections to the existing regional bicycle network paths and trails. Based on feedback from the public survey, 60% of respondents are interested, but concerned about cycling. This matches nationally published information on the types of cyclists in the general population, whereby approximately one-third of the population is not interested in cycling, 60% is interested by concerned, 7% is enthused and confident and less than one percent falls into the strong and fearless category of cyclist. A lack of bicycle infrastructure and safety measures likely prevents many people from cycling within the Route 107 study area.

To evaluate the impediments to cycling along Route 107, a Level of Traffic Stress (LTS) was conducted. The levels are evaluated in the following categories:

- LTS 1: Suitable for a relaxing bicycle ride with little cyclist attention required. Children may need to be supervised at intersections.
- LTS 2: Suitable to most adults, but more demanding than what a child may be expected to handle.
- LTS 3: More traffic stress than LTS 2, acceptable for most cyclists currently riding in the US.
- LTS 4: A level of stress beyond LTS 3.

The entirely of the study area received a rating of LTS 4, meaning that cycling on it is only suitable for “fearless adults.” Figure III-2 displays the LTS rating, along with factors that contributed to it, such as speed limits, shoulders, and turning lanes. Image III.8 illustrates typical biking conditions along Route 107 and the presence of a fearless cyclist traveling southbound at Walmart.

Image III.8: Typical biking conditions.

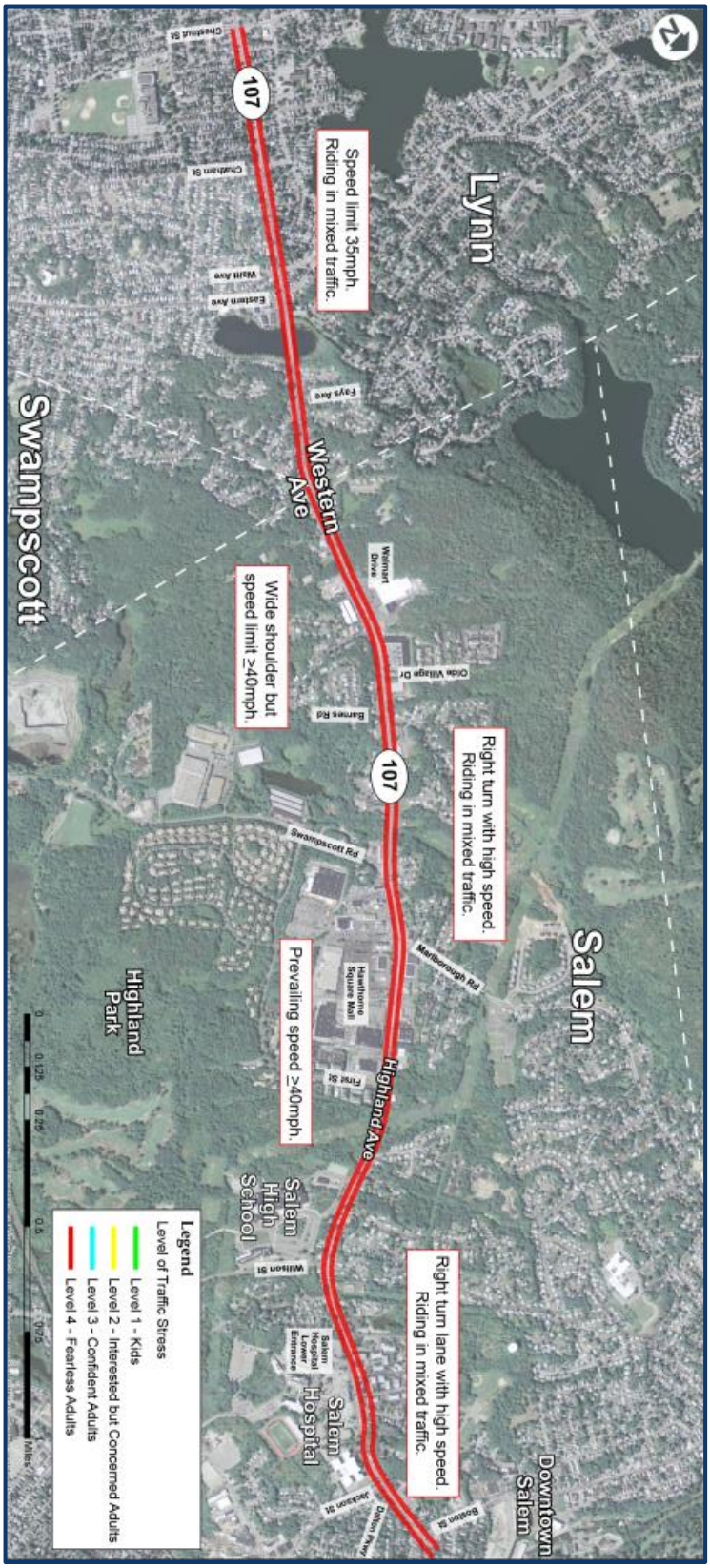


Figure III-2: Study Area-Wide LTS

3. TRANSIT

Transit deficiencies were assessed along the Route 107 study area, with particular emphasis on the bus routes that run along Route 107 including bus routes 424, 450 and 456. Less focus was given to bus routes that cross Route 107 such as bus routes 434 and 436. Transit deficiencies were noted on the basis of the general service and capacity as well as the physical bus stops and locations.

Service Provision and Capacity. Routes 424 and 450 are long bus routes, covering 12 miles one-way between Lynn and Boston, and 15 miles one-way between Salem and Boston, respectively. Both travel along local roads, highways and tunnels, and therefore experience varying/high levels of congestion, which affects the service reliability and on-time performance. Even the local variation of Route 450, between Salem Station and Wonderland Station, is almost 11 miles long. These long bus routes have a tendency to be less reliable, when compared to shorter routes. These two routes also require a transfer to the Blue Line at Wonderland Station to complete a trip to Boston during certain time periods. The bus routes and time tables are provided in the Appendix.

Route 456 operates on weekdays only, and just one bus provides 80 minute headways for a total of six inbound trips and eight outbound trips per day. This limited bus service provides few options for riders travelling to/from the study area. Riders are at a further disadvantage on the weekends when Route 456 does not operate and Route 450W only operates hourly or less.

On-board passenger capacity generally does not appear to be an issue within the Route 107 study area, with the exception of Sunday mornings. The MBTA's Fall 2014 automatic passenger counter (APC) data shows maximum passenger loads of 40 on the first outbound trip from Wonderland at 7:45 A.M. The passenger load exceeds the MBTA's Service Delivery Policy for vehicle load standards on weekends, which is about 35 passengers. The load issue is experienced for about 24 stops, across 3 miles, and a travel time of at least 10 minutes. Review of the boardings and alightings by location suggests that retail employees are likely using this service to get to work. The limited service may contribute to the high volume on the first outbound trip, since users have limited options for arrival times.

Some bus stop descriptions could be more appropriately named to the corresponding side street, such the stop opposite Buchanan Circle is at the intersection of Belleaire Avenue, and the stop opposite Almeda Street is at the intersection of Greenway Road. This would provide clearer direction on the actual stop location for riders and MBTA service planners.

Bus Stop Location and Spacing.
Upon review and evaluation of the existing bus stop locations, the following deficiencies are noted:

- Some bus stops lack a bus stop pair, meaning that a bus stop is not provided in the same location for the opposite direction of travel.
- More than half of the bus stops lack connection to a crosswalk that traverses Route 107, as shown in Image III.9, which shows Eastern Avenue looking north at Buchanan Bridge.
- Several bus stops lack curb ramps entirely or have curb ramps that are inadequate.
- Connectivity at bus stops is often limited. Ten bus stops are located opposite of medians with guardrail, eliminating connectivity across Route 107. Curbside guardrail at the Buchanan Circle outbound stop in Lynn, as shown in Image III.10, creates pedestrian obstacles.
- Some bus stop locations are poorly placed in terms of roadway geometry, resulting in sight distance issues. For example, the inbound bus stops at Valley Street and outbound bus stop opposite Olde Village Road in Salem, as shown in Image III.11, are located after a curve in the road, limiting sight distance for bus operators and bus riders.

Image III.9: No crosswalk across Eastern Ave, to rear of outbound bus stop.

Image III.10: Bus stop behind guardrail outbound at Buchanan Circle.

Image III.11: Bus stop after curve in road, outbound opposite Olde Village Rd.

- The inbound Marlborough Road stop, as sown in Image III.12, is located in a right turn only lane, requiring the bus to merge with general traffic in the middle of the intersection, as there is no receiving lane on the other side of the intersection.
- Some bus stops have inadequate length. For example, opposite Victory Road, as shown in Image 3.13, a bus that pulls to the bus stop sign will block the abutting crosswalk.

Bus stop spacing is summarized in Table 3.1. Several bus stops are located close together, some as close as 287 feet, while others are quite far apart, up to 1,486 feet. The MBTA's Bus Stop Design Guidelines call for bus stops to be located between 750 and 1,350 feet apart, so improved bus stop spacing and consolidation should be considered at strategic points. Bus stops spaced closely together add to the overall trip time and result in additional sidewalk and sign maintenance, ultimately adding to service and operation costs. Furthermore, several bus stops experience very low ridership and could be potential candidates for bus stop removal.

Image III.12: Bus stop in right turn lane, inbound at Marlborough Rd.

Image III.13: Bus stop too short, stopped bus blocks crosswalk access opposite Victory Rd.

Table III.1: Bus Stop Spacing and Ridership (Fall 2014)

Inbound Stops	Distance to next stop (feet)	Weekday Ridership (Ons)	Weekday Ridership (Offs)	Stop located opposite median guardrail	Stop abuts a perpendicular crosswalk
Essex St. Opp Warren St.	1292	46	3		x
Highland Ave @ Proctor St.	687	11	6		X
Highland Ave @ Salem Hospital	654	74	11		X
Highland Ave @ Almeda St.	485	3	2		X
Highland Ave @ Cherry Hill Ave.	630	3	1		X
Highland Ave @ Valley St.	546	9	3		
Highland Ave @ Freeman Rd.	1119	0	0	X	
Highland Ave Opp First St.	1125	3	1	X	
Highland Ave @ Hawthorne Sq.	775	55	45		
Highland Ave @ Marlborough Rd.	824	32	12		X
Highland Ave @ Thomas Circle	1460	4	6		
Highland Ave Opp Cedar Rd.	647	2	1	X	
Highland Ave @ Ravenna Ave.	541	4	2		X
Highland Ave @ 400 Highland Place	1169	9	3		X
Highland Ave @ Walmart	1478	27	12	X	
Highland Ave Opp. Buchanan Circle	891	2	1		
Western Ave Opp Fays Ave.	491	5	1		
Western Ave Opp Victory Rd.	679	2	0		X
Western Ave Opp Eastern Ave.	535	19	12		
Western Ave @ North Maple St.	351	19	2		X
Western Ave @ Brooklawn Terrace	850	4	1		
Western Ave @ Chatham St.	605	28	14		
Western Ave Opp Tracy Ave	354	8	3		X
Western Ave @ Cross St.	795	11	2		X
Western Ave @ Chestnut St.		42	18		X
TOTAL		**422**	**162**	**4**	**13**

Table III.1 (Continued): Bus Stop Spacing and Ridership (Fall 2014)

Outbound Stops	Distance to next stop (feet)	Weekday Ridership (Ons)	Weekday Ridership (Offs)	Stop located opposite median guardrail	Stop abuts a perpendicular crosswalk
Western Ave @ Chestnut St.	885	28	34		X
Western Ave @ West Colony Rd.	448	6	20		X
Western Ave @ Tracy Ave.	427	4	5		
Western Ave @ Chatham St.	656	15	26		X
Western Ave @ Lloyd Terrace	760	1	6		
Western Ave @ Waitt Ave.	402	1	12		X
Western Ave @ Eastern Ave.	728	20	9		
Western Ave @ Victory Rd.	419	0	3		
Western Ave @ Fays Ave.	733	1	7		
Western Ave @ Buchanan Circle	1244	2	3		X
Highland Ave @ Wyman Ave.	722	0	1	X	
Highland Ave Opp Walmart	821	10	28		X
Highland Ave Opp Olde Village Dr.	510	6	14		X
Highland Ave @ Barnes Rd.	653	2	2		X
Highland Ave @ Cedar Rd.	605	0	0	X	
331 Highland Ave.	1042	1	4	X	
Highland Ave @ Greenledge Rd.	1486	3	46	X	
Highland Ave @ Hawthorne Sq.	1048	32	82		
Highland Ave @ First St.	1211	7	7	X	
Highland Ave Opp Freeman Rd.	706	0	2	X	
Highland Ave Opp Valley St.	287	1	7		
Highland Ave @ Wilson St.	750	4	6		X
Highland Ave @ Almeda St.	490	0	2		X
Highland Ave @ Salem Hospital	939	9	70		X
Highland Ave Opp Proctor St.	345	5	18		X
Highland Ave Opp 30 Highland Ave.	676	1	32		X
Essex St. @ Warren St.					X
TOTAL		**159**	**446**	**6**	**14**

Physical Condition of Bus Stops. Many of the bus stop deficiencies have been noted in the under the pedestrian deficiencies and include missing sidewalks, narrow or obstructed sidewalks, and missing curb ramps and crosswalks. The required landing area for a bus stop is eight feet in depth and most of the sidewalks are less than eight feet wide. The absence of a sidewalk, as shown in Image III.14, means that there are no good pedestrian connections to the stop, nor is there a level concrete landing area (at least a five ft. by eight ft. clear, level space) for boarding/alighting. Landing areas at driveways are equally undesirable since they are not level and block access to the driveway, such as at the outbound stop at Eastern Avenue, which is located between the driveway to a gas station, and a driveway to a strip mall, per Image III.15. Image III.16 shows the lack of a landing area at the inbound stop at Brooklawn Terrace.

Image III.14: No sidewalk at or connecting to bus stop, inbound at opposite First St.

Image III.15: Eastern Avenue outbound stop located between two busy driveways with no landing area or safe/defined waiting area.

Image III.16: No concrete landing area at bus stop, inbound at Brooklawn.

Bus Stop Signage and Amenities. One bus stop sign was provided at the majority of bus stop locations. At locations where on-street parking is permitted, the lack of a second bus stop sign makes it difficult to identify and enforce the no parking zone at the bus stop. Signs are missing at some stops, such as opposite Walmart and on both sides of the road at Procter Street.

None of the current bus stop signs meet the most current standards, based upon the MBTA Bus Stop Design Guidelines (2016). Numerous signs are faded, non-reflective, and/or don't show the bus stop identification number. Many signs are positioned incorrectly vertically, making them difficult to read or a potential obstacle. Other bus stop signs are poorly positioned horizontally, resulting in obstructed sight lines or signs damaged by moving traffic. Various issues with bus stop signage within the study area are displayed in Images III.17 – III.21.

Image III.17: Inbound at Walmart – 3rd highest inbound stop in corridor.

Image III.18: Sign position too low, should be on own post, without obscuring pedestrian crossing sign bus stop sign, inbound at Belleaire/opposite Buchanan.

Image III.19: Sign not visible – set too low, on pedestrian signal, set back from curb and obscured by a tree, inbound at Fays.

Image III.20: Bus stop sign faded & posted much too high for pedestrian visibility and set back too far from the curb, essentially on the side street, inbound at Thomas Circle.

Image III.21 Bus stop sign located about 50 feet from the bus shelter.

There is a major lack of street furniture and amenities at bus stops in the study area. Only four shelters were identified as follows:

- MBTA standard bronze shelter is located at Hawthorne Square Mall Shopping Center (the highest ridership inbound stop).
- Custom stone shelter is provided at Salem Hospital – upper (south) driveway.
- CEMUSA standard shelter is provided at the Salem Hospital – lower (north) driveway.
- Custom narrow shelter is provided near Boston and Essex streets, outside of CVS.

Image III.22: No level path from bus stop to shelter; concrete pad for shelter is raised above the sidewalk.

The shelters are generally in good condition although there is no compliant path of travel between the landing area and shelter at both Salem Hospital shelters, as shown in Image III.22. The shelter at Salem Hospital – Upper Driveway is on a raised platform and is not flush with the sidewalk, and there is a grass strip along the roadway edge at Salem Hospital – Lower Driveway. The path of travel from the shelter to the landing area of the Hawthorne Square shelter is in poor condition.

Aside from benches in the shelters, just one stand-alone bench was identified, at Marlborough Road, Image III.23, but it is old, vandalized, in poor disrepair, and needs replacement.

Image III.23: Poorly maintained bench, inbound at Marlborough.

4. VEHICLES

There were a number of vehicle-related deficiencies noted throughout the study area. In terms of the physical infrastructure, the pavement is generally in poor condition, as are the medians. Much of the pavement exhibits cracking. In the Lynn portion of the study, on-street parking is allowed but not delineated. As such, vehicles were observed parked in close proximity to the intersections, hindering sight distance and adding conflict. The Lynn segment also lacks turn lanes at key intersections.

Route 107 in the retail portion in Salem has a freeway style atmosphere with the four travel lanes and median divide with guardrail. Much of the median is not aesthetically pleasing due to the rusted condition and the weeds that have protruded along the curb line. The roadway layout lends to encourage travel speeds and prioritizes the vehicle travel over other modes.

Continuing northerly, Route 107 reduces to two travel lanes in the northern portion of the study area. However, there are areas that lack pavement markings to define the travel lanes and motorists were observed traveling as if there were two travel lanes in one direction.

Traffic operations were described in a prior section, with some study area deficiencies highlighted. In the Lynn segment, a repeated condition exists at signalized intersections with a lack of turn lanes, contributing to the safety issues at these locations. Similarly, curb cuts located close to key intersections is problematic and adds to the conflicts. Queueing between key intersections is noted as problematic, particularly in the retail segment.

The existing signal equipment throughout the study area is mostly outdated and in need of replacement. The pedestrian signals do not meet current standards and the majority of pedestrian signals lack countdown features. Signal coordination is poor or missing entirely throughout the study area.

B. INTERSECTION

As indicated previously, the deficiencies were identified on both a study area-wide and intersection basis. The intersection deficiencies were identified based upon field reviews, data collection, traffic operations and include issues that relate to each mode of transportation. The specifics of each of the fifteen key intersections is noted below beginning at the southern end of the study area and proceeding northerly.

Intersections in Lynn

Route 107 (Western Avenue) at Chestnut Street

Existing aerial of Western Ave at Chestnut St.

The signalized intersection of Route 107 (Western Avenue) at Chestnut Street is a four-way intersection with Route 107 running in the north/south direction and Chestnut Street running in the east/west direction. All approaches to the intersection provide a single multi-use lane. The traffic signal operates with two phases for vehicular traffic including a northbound and southbound Route 107 phase and an eastbound and westbound Chestnut Street phase. There is also an exclusive pedestrian phase with crosswalks spanning each intersection approach and sidewalks provided on both sides of Route 107 and Chestnut Street. On-street parking is available and mostly unregulated and there are no bicycle amenities along Route 107 or Chestnut Street. The intersection has a high crash rate, exceeding the District and state averages.

The following deficiencies have been identified:

Signal-heads mounted on pedestrian poles.

- Sight lines are obstructed by parked, on street vehicles and by the adjacent commercial property in the southwest quadrant to the intersection.
- The traffic signal equipment is outdated and a number of the signal heads are mounted on posts, which are less visible to motorists. The signal lacks coordination with adjacent signals.
- The eastbound and westbound approaches have long queues of traffic.
- Several businesses have multiple curb cuts that create additional conflict points along the two roadways.
- The tight geometry of this intersection makes it difficult for heavy vehicles to execute a turning movement, causing additional delays.
- Frequent congestion during peak periods with the current clearance intervals for vehicular traffic do not provide enough time to clear the intersection.
- The sidewalks adjacent to the signal and pavement are in need of maintenance. There are a number of fixed objects at the back of curb.
- The existing apex style curb ramps are outdated and not ADA accessible.
- There are no bicycle amenities at this intersection or adjacent roadways.

Route 107 (Western Avenue) at Chatham Street

Existing aerial of Western Ave at Chatham St.

The signalized intersection of Route 107 (Western Avenue) at Chatham Street is a four-way intersection with Route 107 running in the north/south direction and Chatham Street running in the east/west direction. All approaches to the intersection provide a single multi-use lane. The traffic signal operates with two phases for vehicular traffic including a northbound and southbound Route 107 phase and an eastbound and westbound Chatham Street phase. There is also an exclusive pedestrian phase with crosswalks spanning each intersection approach and sidewalks provided on both sides of Route 107 and Chatham Street. On-street parking is available and unregulated along this section of Route 107 and on Chatham Street and there are no bicycle amenities on Route 107 or Chatham Street. This intersection has a high crash rate.

The following deficiencies have been identified:

Damaged signal head mounted on pedestrian poles.

- Obstructed sight lines occur due to parked vehicles and buildings in the southwest quadrant.
- The traffic signal equipment is outdated with post mounted signal heads, and the intersection is not coordinated with nearby signals.
- The presence of multiple curb cuts in close proximity to the intersections adds conflict points.
- The intersection geometry lacks turn lanes which likely contributes to the high crash rate. It includes tight turn radii which are difficult for heavy vehicles to navigate.
- Long queues occur at this location, there is congestion during peak periods, and the current clearance intervals for vehicular traffic are insufficient.
- The sidewalks adjacent to the signal and pavement are in need of maintenance.
- The existing apex style curb ramps are outdated and not ADA accessible.
- During field observations, it was noted that two of the four pedestrian signal push-buttons were unresponsive when pushed. This creates a potential safety hazard for pedestrians attempting to cross the intersection during a vehicular phase.
- There are no bicycle amenities at this intersection or adjacent roadways.

Route 107 (Western Avenue) at Maple Street/Waitt Avenue

The signalized intersection of Route 107 (Western Avenue) at Maple Street/Waitt Avenue is a four-way intersection with Route 107 running in the north/south direction and Maple Street/Waitt Avenue running in the east/west direction. All approaches to the intersection provide a single multi-use lane. The traffic signal operates with two phases for vehicular traffic including a northbound and southbound Route 107 phase and an eastbound and westbound Maple Street/Waitt Avenue phase. There is also an exclusive pedestrian phase with crosswalks spanning each intersection approach and sidewalk provided on both sides of Route 107 and Maple Street/Waitt Avenue. On-street parking is available on Route 107 and Maple Street/Waitt Avenue. There are no bicycle amenities on Route 107 or Maple Street/Waitt Avenue.

Existing aerial of Western Ave at Maple St/Waitt Ave.

The following deficiencies have been identified:

Signal heads mounted on pedestrian poles.

- The traffic signal equipment is outdated and a number of the signal heads are mounted on posts, which are less visible to motorists.
- There is currently no emergency pre-emption at the intersection, hindering emergency response time and increasing crash risks.
- Frequent congestion during peak periods with the current clearance intervals for vehicular traffic do not provide enough time to clear the intersection as noted in the field; vehicles turning left at any approach are often left over at the all-red phase. The eastbound Maple Street approach is over capacity with high delays in peak periods.
- The sidewalks adjacent to the signal and pavement are in need of maintenance.
- The existing apex style curb ramps are outdated and non-ADA compliant.
- There are no bicycle amenities at this intersection or adjacent roadways.

Route 107 (Western Avenue) at Eastern Avenue/Stanwood Street

The unsignalized intersection of Route 107 at Eastern Avenue/Stanwood Street is a four-way intersection with Route 107 running in the north/south direction, Stanwood Street connecting from the west, and Eastern Avenue, a major residential road, connecting from the east. Stanwood Street and Eastern Avenue are under stop-control and Route 107 runs uncontrolled. There is sidewalk available on both sides of Stanwood Street and Eastern Avenue and on both sides of Route 107 for the majority of the roadway. There is a crosswalk spanning Stanwood Street and a crosswalk spanning Route 107 directly between the offset of Stanwood Street and Eastern Avenue. There are no bicycle amenities on Route 107, Stanwood Street or Eastern Avenue. This intersection has a high crash rate.

Existing aerial of Western Ave at Eastern Ave/Standwood St.

The following deficiencies have been identified:

Northbound vehicles passing on the right side along Route 107.

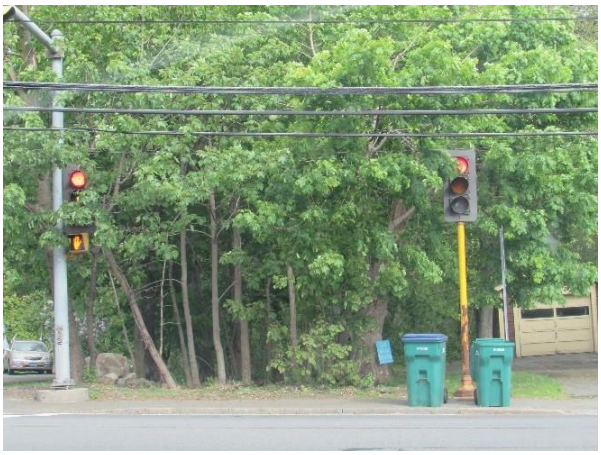
- A high number of crashes were reported at this intersection, many to do with poor sight lines for the minor road approaches and the unconventional offset of the minor roads across Route 107.
- The intersection has poor levels of service with high delays experienced on the side street approaches.
- There are wide lanes along this section of Route 107, which make it unclear if the roadway is intended to be one large lane or two lanes. Motorists have been observed passing (stopped vehicles?) in these single lane segments due to the width of the roadway.
- While there is a crosswalk spanning Route 107 and Stanwood Street, there is a missing crosswalk spanning Eastern Avenue at the intersection with Route 107.
- The existing apex style curb ramps are outdated and non-ADA compliant.
- Several businesses have multiple curb cuts that create additional conflict points along Route 107 and Eastern Avenue.
- The sight distance is poor for the Eastern Avenue approach.
- There are no bicycle amenities at this intersection or adjacent roadways.

Route 107 (Western Avenue) at Fays Avenue

Existing aerial of Western Ave and Fays Ave.

The signalized intersection of Route 107 (Western Avenue) at Fays Avenue is a three-way intersection with Route 107 running in the north/south direction and Fays Avenue running in the westbound direction. The northbound approach on Route 107 provides an exclusive left-turn lane and a through lane. The Route 107 southbound approach and the Fays Avenue westbound approach to the intersection provide a single multi-use lane. The traffic signal operates with three phases for vehicular traffic including a lead protected phase for the northbound left-turn and through movements, followed by a northbound and southbound through phase where northbound left-turns are permissible, and a protected Fays Avenue westbound phase for left and right turn movements. There is also an exclusive pedestrian phase with crosswalks spanning the westbound and southbound approaches and sidewalks provided on both sides of Route 107 and Fays Avenue. There are no bicycle amenities on Route 107 or Fays Avenue.

The following deficiencies have been identified:



Signal head mounted on a post and blocked by overgrown vegetation.

- The intersection operates poorly during the weekday morning and afternoon peak hours. The southbound approach in particular operates with high delays and is often over capacity during peak hours.
- The traffic signal equipment is outdated, some of the signal heads are pedestal mounted, and therefore less visible to motorists. There is a driveway within the signalized intersection.
- The Fays Avenue westbound signals mounted on posts are also blocked by overgrown vegetation, hindering visibility of the signal.
- The sidewalks adjacent to the signal and pavement are in need of maintenance.
- The existing apex style curb ramps are outdated and non-ADA compliant.
- There are no bicycle amenities at this intersection or adjacent roadways.

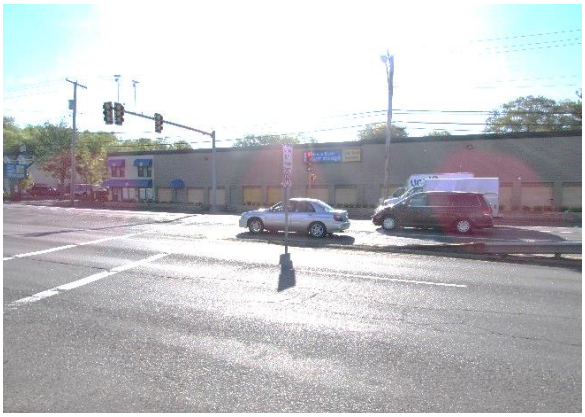
Intersections in Salem

Route 107 (Highland Avenue) at Walmart Driveway

Existing aerial of Western Ave at Walmart Drive.

The signalized intersection of Route 107 (Highland Avenue) at the Walmart Driveway is a three-way intersection with Route 107 (Highland Avenue) running in the north/south direction and the Walmart Driveway running in the westbound direction. The northbound approach on Route 107 provides an exclusive left-turn lane and two through lanes while the southbound approach provides an exclusive right-turn lane and two through lanes. The Walmart Driveway westbound approach to the intersection currently provides an exclusive left-turn lane and an exclusive right-turn lane. The traffic signal operates with three phases for vehicular traffic including a lead protected left-turn phase for the northbound left-turn movement on Route 107 with overlapping eastbound right turns, a shared northbound and southbound phase for through and right-turn movements, and a phase for the eastbound approach with protected left turns and with an overlapping right-turn movement for the southbound approach. There is also an exclusive pedestrian phase with a crosswalk spanning the northbound approach and a sidewalk provided on the eastern side of Route 107. There are minimal bicycle amenities along this section of Route 107.

The following deficiencies have been identified:



Vehicle waiting past the stop bar for northbound left turn phase.

- The signal detection on the Walmart approach is not working properly.
- Observations from the field noted that vehicles entering the intersection from the northbound approach often stopped past the stop bar, leading to detection issues and causing vehicle phases to be skipped during the cycle (mainly the northbound left-turn).
- The intersection is very wide and requires high clearance intervals to clear traffic and pedestrians in the intersection.
- There are limited pedestrian amenities in the form of a sidewalk on only one side of Route 107 and only one pedestrian crosswalk spanning Route 107.
- The pavement and sidewalks currently provided adjacent to the signal are in need of maintenance.
- There are minimal bicycle amenities in the form of bicycle detection at the signal.

Route 107 (Highland Avenue) at Olde Village Drive

Existing aerial of Highland Ave at Olde Village Drive.

The signalized intersection of Route 107 (Highland Avenue) at Olde Village Drive is a three-way intersection with Route 107 (Highland Avenue) running in the north/south direction and Olde Village Drive connecting from the west. The northbound approach on Route 107 provides an exclusive left-turn lane and two through lanes while the southbound approach provides an exclusive through lane and a shared through and right-turn lane. The Olde Village Drive eastbound approach currently provides an exclusive left-turn lane and an exclusive right-turn lane. The traffic signal operates with three phases for vehicular traffic including a lead protected left-turn phase for the northbound left-turn movement on Route 107 with overlapping eastbound right turns, a shared northbound and southbound phase for through and right-turn movements, and a phase for the eastbound approach with protected left turns. There is also an exclusive pedestrian phase with a crosswalk spanning the northbound approach and sidewalks provided on the eastern side of Route 107 and on the southwest corner of the intersection. There are minimal bicycle amenities along this section of Route 107.

The following deficiencies have been identified:

- Queuing on the Route 107 southbound approach is long during peak periods. Despite signs that prohibit U-turns, there are a number of U-turns occurring at this intersection.
- There are limited pedestrian amenities in the form of a sidewalk on the eastern side and southwestern corner of Route 107 with only one pedestrian crosswalk spanning Route 107.
- The sidewalks currently provided adjacent to the signal are in need of maintenance.
- Aside from shoulder area, there are no bicycle amenities at this intersection or adjacent roadways.

Signal head mounted on a post and unprotected from oncoming traffic by curb or rail.

Route 107 (Highland Avenue) at Barnes Road/Ravenna Avenue

The signalized intersection of Route 107 at Barnes Road/Ravenna Avenue is a four-way intersection with Route 107 running in the north/south direction and Barnes Road running in the west direction and Ravenna Avenue running in the east direction. The westbound and eastbound approaches each provide a single multi-use lane, while the northbound and southbound direction each provide an exclusive left-turn lane and an exclusive through lane and a shared through and right-turn lane. The traffic signal operates with four phases for vehicular traffic including a lead protected left-turn movement and through phase for the southbound approach, a phase for southbound and northbound through movements with left-turn movements prohibited, followed by a lagging protected left-turn and through phase for the northbound approach and a phase for eastbound and westbound traffic on Ravenna Avenue and Barnes Road, respectively. There is also an exclusive pedestrian phase and a crosswalk spanning the westbound and northbound approaches at this intersection. North of the intersection sidewalks are currently on both sides of Route 107 and south of the intersection sidewalks are provided on the eastern side only of Route 107. Sidewalks are present on both sides of Ravenna Avenue and on the northern side of Barnes Road. There are minimal bicycle amenities in the form of bicycle detection at both approaches of Route 107 and the Barnes Road approach. However, field observations noted that the signal was unresponsive to bicycle detection.

Existing aerial of Highland Ave at Barnes Rd/Ravenna Ave.

The following deficiencies have been identified:

- The traffic signal equipment lacks pedestrian signals.
- The intersection is very wide and requires high clearance intervals to clear traffic and pedestrians in the intersection.
- The existing curb ramps at the corners of Barnes Road are apex style curb ramps that do not comply with ADA standards.
- There are no bicycle amenities at this intersection or adjacent roadways.
- The median is in poor condition.
- Route 107 southbound left queue exceeds the storage in peak periods.

Route 107 (Highland Avenue) at Swampscott Road/Dipietro Avenue

The signalized intersection of Route 107 (Highland Avenue) at Swampscott Road/Dipietro Avenue is a four-way intersection with Route 107 running in the north/south direction and Swampscott Road running in the northwest direction and Dipietro Avenue running in the west direction. The northbound approach on Route 107 provides an exclusive through lane, a shared through and right-turn lane and a channelized right-turn lane under yield control while the southbound approach provides two exclusive through lanes and an exclusive left-turn lane. The Swampscott Road approach currently provides an exclusive left-turn lane and an exclusive right-turn lane. The Dipietro Avenue approach provides a single multi-use lane. The traffic signal operates with four phases for vehicular traffic including a northbound and southbound Route 107 through phase with a lagging protected phase for the southbound left-turn and through movements, a westbound Dipietro Avenue phase and a phase for the Swampscott Road approach. There is also an exclusive pedestrian phase with crosswalks spanning the eastern side of Route 107, crossing the northbound channelized right-turn and the Swampscott Road/Dipietro Avenue approaches. Sidewalks are provided on the eastern side of Route 107 and both sides of Swampscott Road.

Existing aerial of Highland Ave at Swampscott Rd/Dipietro Ave.

The following deficiencies have been identified:

- The traffic signal equipment is outdated and the signal coordination is not functioning properly.
- There is currently no emergency preemption at the intersection, hindering emergency response time and increasing crash risks.

- Frequent congestion during peak periods with the current clearance intervals for vehicular traffic do not provide enough time to clear the intersection.
- Despite prohibitory signage, U-turns are made at this intersection.
- The Swampscott Road northwestbound approach operates over capacity. The intersection suffers from long delays and long queues.
- The sidewalks adjacent to the signal and pavement are in need of maintenance. The intersection lacks a crosswalk on Route 107
- There are minimal bicycle amenities in the form of bicycle detection at all approaches of the intersection.
- This intersection is part of the "zig zag" movement that occurs with motorists seeking east-west connections utilizing Swampscott Road, Route 107 and Marlborough Road.

Route 107 (Highland Avenue) at Marlborough Road/Traders Way

The signalized intersection of Route 107 (Highland Avenue) at Marlborough Road/Traders Way is a four-way intersection with Route 107 running in the north/south direction and Marlborough Road running in the west direction and Traders Way running in the east direction. The northbound and southbound approaches along Route 107 each provide an exclusive left-turn lane, two through lanes and an exclusive right-turn lane. The Marlborough Road approach provides a shared through and left-turn lane and an exclusive right-turn lane. The Traders Way approach provides an exclusive left-turn lane, a shared left-turn and through lane and a channelized right-turn lane under stop control. The traffic signal operates with five phases for vehicular traffic including a lead protected left-turn movement and through phase for the northbound approach with an overlapping right-turn movement from the Marlborough Road approach, followed by a phase for northbound and southbound through movements where left-turn movements are prohibited, a lagging protected left-turn and through phase for the Route 107 southbound approach and split phasing between the eastbound and westbound approaches. There is also an exclusive pedestrian phase with crosswalks spanning all approaches at this intersection. South of this intersection sidewalks are provided on the eastern side of Route 107. Continuing north sidewalks are provided on both sides of Route 107. Sidewalks are present on both sides of Marlborough Road and the northern side of Traders Way. The intersection has a high crash rate.

Existing aerial of Highland Ave at Marlborough Rd/Traders Way.

The following deficiencies have been identified:

- The traffic signal equipment is outdated and there is currently no emergency preemption at the intersection, hindering emergency response time and increasing crash risks.
- Frequent congestion during peak periods with inadequate coordination and clearance. The intersection operates at an overall level of service E during the weekday morning peak hour and at level of service F during the weekday PM peak hour and the Saturday midday peak hour.
- The sidewalks adjacent to the signal and pavement are in need of maintenance.
- The intersection is very wide and requires high clearance intervals to clear traffic and pedestrians in the intersection.
- There are minimal bicycle amenities in the form of detection at all approaches of the intersection.
- Travel patterns reveal that shopping center cut-thru traffic occurs at this location, as well as U-turn traffic.

Route 107 (Highland Avenue) at Hawthorne Square Mall Shopping Center/Site Drive

The signalized intersection of Route 107 (Highland Avenue) at Hawthorne Square Mall Shopping Center/Site Drive is a four-way intersection with Route 107 running in the north/south direction and Hawthorne Square Mall Shopping Center connecting from the east and the Site Drive connecting from the west. The northbound approach provides an exclusive left-turn lane, a through lane and a shared through and right-turn lane. The Route 107 southbound approach provides an exclusive left-turn lane, two through lanes and an exclusive right-turn lane. The Hawthorne Square Mall Shopping Center approach provides a shared left-turn and through lane and a channelized right-turn lane under yield control. The eastbound site drive approach currently provides a single multi-use lane. The traffic signal operates with three phases for vehicular traffic including a lead protected left-turn movements phase for the northbound and southbound approaches, followed by a phase for northbound and southbound through movements where left-turn movements are prohibited, and a phase for the eastbound and westbound approaches with permissible left-turns. There is also an exclusive pedestrian phase with crosswalks spanning the southbound and westbound approaches at this intersection. Sidewalks are provided on both sides of Route 107 and on the northern side of Hawthorne Square Mall Shopping Center.

Existing aerial of Highland Ave at Hawthorne Square Mall Shopping Center/Site Drive.

The following deficiencies have been identified:

- The traffic signal equipment is outdated and lacks emergency preemption.
- Frequent congestion during peak periods with southbound approach experiencing long delays and queues. The intersections operates at level of service F in the Saturday peak period.
- Despite prohibitive signage, U-turns occur at this location.
- Pavement markings are faded at this location.
- Travel patterns reveal that Route 107 southbound lefts are likely routed towards Swampscott Road and are using this intersection to avoid signals downstream.
- The sidewalks adjacent to the signal and pavement are in need of maintenance.
- The existing Route 107 crosswalk is very long with no refuge area midway and there is no crosswalk on the northbound and eastbound approaches.
- Bicycle amenities consist solely of bicycle detection at all approaches of the intersection.

Route 107 (Highland Avenue) at Cherry Hill Avenue/Willson Street

The signalized intersection of Route 107 (Highland Avenue) at Cherry Hill Avenue/Willson Street is a four-way intersection with Route 107 running in the north/south direction and Cherry Hill Avenue running in the west direction and Willson Street running in the east direction. The northbound approach provides a through lane and a shared through and right-turn lane while the southbound approach provides a shared left-turn and through lane and an exclusive through lane. The westbound approach on Willson Street provides an exclusive left-turn lane and a shared left-turn and right-turn lane. The eastbound approach on Cherry Hill Avenue is one-way in the eastbound direction and provides an exclusive left-turn lane and a shared through and right-turn lane. The traffic signal operates with four phases for vehicular traffic including a lead southbound phase, a northbound and southbound phase with permissible southbound left-turns and a split phase between the eastbound and westbound approaches. There is also an exclusive pedestrian phase and crosswalks spanning each approach at this intersection and sidewalk on both sides of Route 107 and Willson Street.

Existing aerial of Highland Ave at Cherry Hill Ave/Willson St.

The following deficiencies have been identified:

- The traffic signal equipment is outdated, lacks emergency preemption, has poor timing, and inconsistent audible accessibility.

- Frequent congestion during peak periods with westbound queues extending towards Salem High School, which is on the south side of Willson Street. Route 107 southbound approach operates with a defacto left turn lane, and encounters long delays during peak hours. The intersection operates at an overall level of service E in the morning peak period.
- Pavement markings are faded at this location.
- The clearance intervals for vehicular traffic and pedestrians are inadequate.
- There are no bicycle amenities at this intersection or adjacent roadways.

Route 107 (Highland Avenue) at Lower Driveway of Salem Hospital

The unsignalized intersection of Route 107 (Highland Avenue) at the Lower Driveway of Salem Hospital is a three-way intersection with Route 107 running in the north/south direction and the Lower Driveway of the Salem Hospital connecting from the east. The westbound approach is under stop-control and Route 107 runs uncontrolled. Along this section of roadway, Route 107 provides one-lane of travel in each direction while the westbound approach provides an exclusive left-turn lane and an exclusive right-turn lane. There are sidewalks available on both sides of Route 107 and a sidewalk located on the southern side of the Lower Driveway of Salem Hospital. There is a crosswalk spanning the Lower Driveway of Salem Hospital approach.

Existing aerial of Highland Ave at Lower Driveway of Salem Hospital.

The following deficiencies have been identified:

- There is significant delay for the westbound approach.
- There are wide lanes and faded pavement markings along this section of Route 107, which make it unclear if the roadway is intended to be one large lane or two lanes. Motorists have been observed passing in these single lane segments due to the width of the roadway.
- The existing curb ramps are outdated and non-ADA compliant.
- There are no bicycle amenities at this intersection or adjacent roadways.

Route 107 (Highland Avenue/Essex Street) at Jackson Street/Dalton Parkway

The signalized intersection of Route 107 (Highland Avenue/Essex Street) at Jackson Street/Dalton Parkway is a four-way intersection with Route 107 running in the north/south direction, Jackson Street running in the westbound direction and Dalton Parkway running in the northwest direction. The northbound approach on Route 107 provides a through lane and an exclusive right-turn lane while the southbound approach provides an exclusive left-turn lane and a through lane. The Jackson Street approach currently provides an exclusive left-turn lane and an exclusive right-turn lane.

Existing aerial of Highland Ave/Essex St at Jackson St/Dalton Parkway.

The Dalton Parkway approach is uncontrolled by the signal but provides an exclusive right-turn only under yield control. The traffic signal operates with three phases for vehicular traffic including a lead protected phase for the southbound left-turn and through movements, followed by a northbound and southbound through phase where southbound left-turns are permissible, and a protected Jackson Street westbound phase for left and right-turn movements. There is also an exclusive pedestrian phase with crosswalks spanning the northbound approach and the Jackson Street/Dalton Parkway approaches. Sidewalks are provided on both sides of Route 107, Jackson Street and Dalton Parkway. There are no bicycle amenities on Route 107, Jackson Street or Dalton Parkway. The intersection has a high crash rate.

The following deficiencies have been identified:

- The traffic signal equipment is outdated and a number of the signal heads are mounted on posts, which are less visible to motorists.
- The signal lacks emergency preemption.
- Frequent congestion occurs during peak periods with inadequate clearance intervals, illegal left turns made from the right turn lane, and long queues on Route 107.
- The sidewalks adjacent to the signal and pavement are in need on maintenance.
- The existing apex style curb ramps are outdated and non-ADA compliant.
- There are no bicycle amenities at this intersection or adjacent roadways.
- The “no left turn” signs on Dalton Parkway are inadequate and frequently ignored. Dalton Parkway lacks wayfinding signage.

Route 107 (Essex Street) at Boston Street (Route 107)

Existing aerial of Essex St at Boston St.

The signalized intersection of Route 107 (Essex Street) at Boston Street (Route 107) is a four-way intersection with Route 107 running in the northbound and eastbound direction (Boston Street) and Essex Street running in the southbound direction and a private driveway running in the westbound direction. The northbound approach provides an exclusive left-turn lane and a through lane and the southbound approach provides a through lane and an exclusive right-turn lane. The eastbound approach provides exclusive left-turn and right-turn lanes. The westbound approach is a one-way direction towards the intersection and provides a multi-use lane. There is a wide median on the northbound and southbound approaches and a number of driveways enter the roadways in close proximity to the intersection. The traffic signal operates with four phases for vehicular traffic including a lead protected northbound phase with an overlapping eastbound right-turn movement, a northbound and southbound through phase where northbound left-turns are prohibited and a split phase between the westbound and eastbound approaches. There is also an exclusive pedestrian phase and crosswalks spanning the northbound and eastbound approaches at this intersection and sidewalks on both sides of Route 107, Boston Street and Essex Street.

The following deficiencies have been identified:

- The clearance intervals for vehicular traffic and pedestrians do not provide enough time to clear the intersection.
- There is an outdated emergency phone in the sidewalk adjacent to the southeastern quadrant of the intersection.
- The traffic signal equipment is outdated and does not meet current standards. The driveway approach lacks detection.
- Pavement markings are inadequate for the left turn lane.
- The existing curb ramps are apex style ramps that do not provide sufficient guidance to sight impaired users.
- There are no bicycle amenities at this intersection or adjacent roadways.

IV. FUTURE YEAR PROJECTIONS

A. INTRODUCTION

The 2015 existing peak hour traffic volumes were projected to the year 2035 to determine future traffic demands on the study area roadways. Traffic growth is primarily a function of changes in motor vehicle use and land development in the region. Proposed developments in Lynn and Salem were reviewed to identify any potential future traffic generators along Route 107 in the study area. In addition to specific traffic generators, changes in regional travel demands were reviewed with the assistance of the Central Transportation Planning Staff (CTPS). CTPS maintains a regional traffic demand model that uses land use and socioeconomic inputs to forecast future traffic volumes. CTPS reviewed the Route 107 study area and adjacent land uses to develop annual traffic growth rates utilizing the model. The developments and growth rates are discussed in greater detail below.

B. FUTURE LAND USE DEVELOPMENT

Several parcels, shown in Figure IV-1, are identified for redevelopment. Those abutting Route 107 include 355-373 Highland Avenue, which comprise the Cinemaworld Development. This development has not been permitted. Preliminary plans propose a movie theater, bowling arcade, and family entertainment center. Other areas of potential redevelopment include Walmart in Salem near the Lynn border, and the expansion of the Salem Hospital on the northern segment of the study area. No significant impacts are anticipated for the expansion of the Salem Hospital, based upon the Environmental Notification Notice.

Future land use changes are expected to impact the amount of traffic traveling on Route 107 in the study area. To understand the anticipated land use changes, planned developments were identified by the cities of Lynn and Salem to be:

- Salem Hospital expansion
- Transfer Station on Swampscott Road
- Residential developments along the study area
- Cinemaworld Complex on Route 107 south of Swampscott Road

The developments identified by Lynn and Salem were shared with CTPS to determine if the regional model accounted for the noted developments. All of the developments except for the proposed Cinemaworld Complex were accounted for in the regional traffic demand model. Traffic associated with the proposed Cinemaworld Complex was added to the study area roadways in addition to the background traffic growth identified by CTPS.

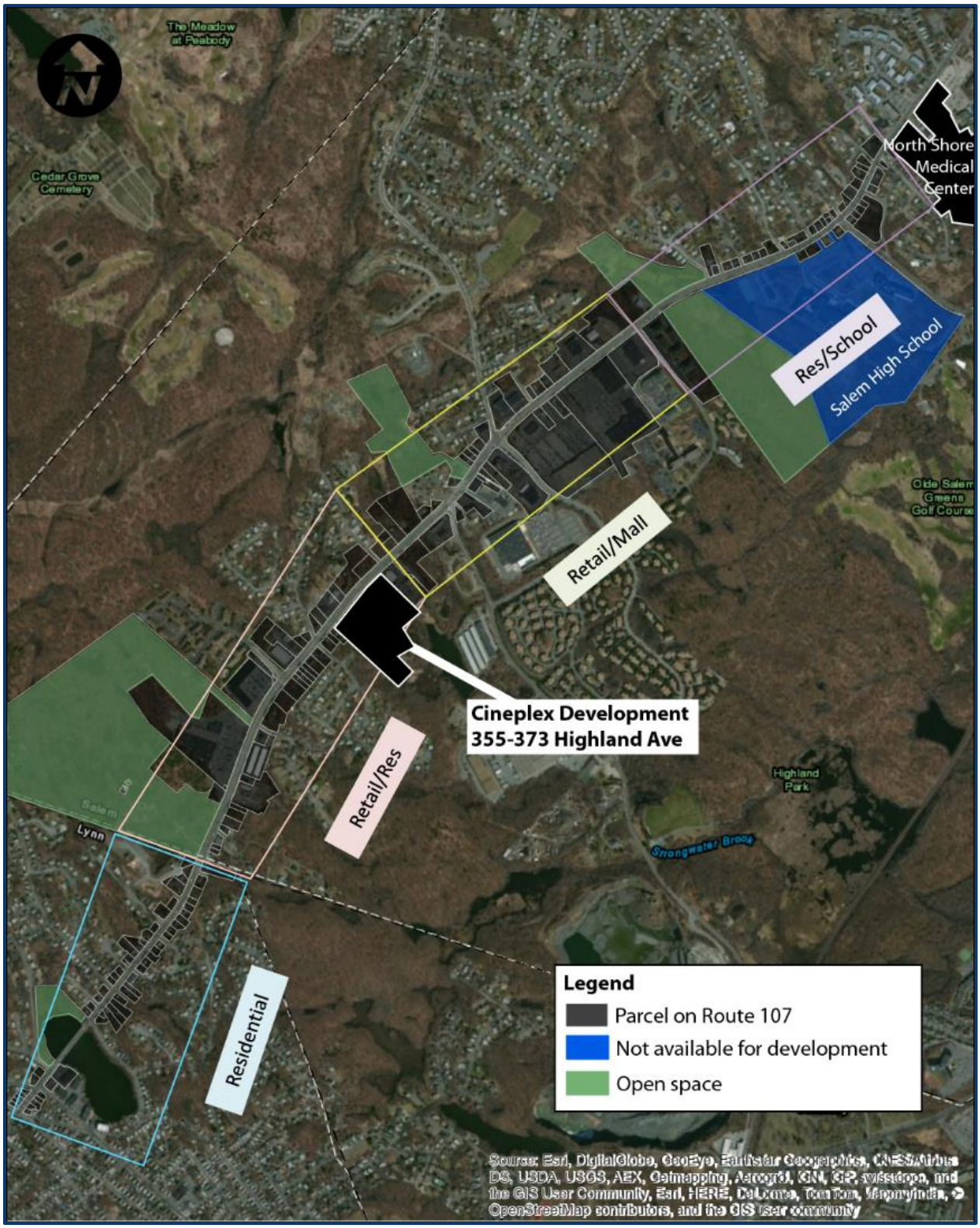


Figure IV-1: Future Development

The proposed Cinemaworld Complex project is located south of Swampscott Road on the east side of Route 107, as depicted in Figure IV-2. As part of the project, mitigation within the Route 107 study area is currently proposed to include the addition of a traffic signal with auxiliary left turn lanes on Route 107 at the currently unsignalized Cedar Road intersection. The process for developing the future 2035 traffic volumes including the CTPS traffic projections and traffic expected to be generated by specific developments is discussed in detail below.

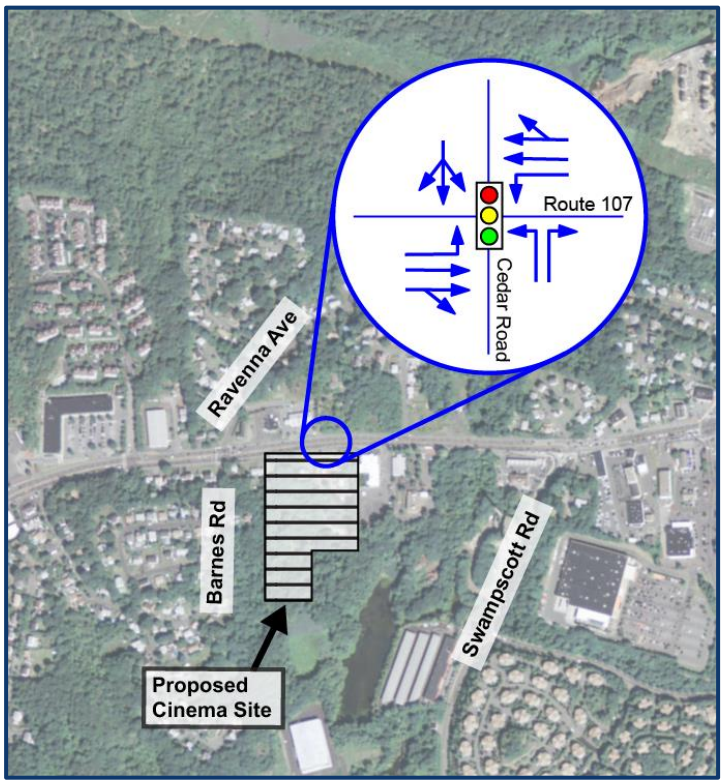


Figure IV-2: Proposed Cinema Site

In addition to the known developments, the land use within the study area was reviewed to identify developable land. The land surrounding the study area is already largely developed with mainly residential or residential conservation zoning. The Lynn segment of the study area in particular is densely developed, and almost all of it is residential, with little redevelopment potential. The Salem segment contains more potential for the redevelopment of existing commercial space, such as the Cinemaworld Complex development noted above.

The northern end of the study area, characterized by older industrial buildings, is the area with the most redevelopment potential. This area is likely to see the redevelopment of older, existing structures into new residential/mixed use buildings. The North River Canal Park area, just north of the study area, has been targeted as a location by the city for its redevelopment potential due to its old industrial buildings and underutilized, auto-oriented space along the railroad tracks. North River Canal Park falls between Bridge Street and Mason Street with the North River in between. The proximity of the Salem commuter rail station gives the area further redevelopment potential. Other neighborhoods in Salem, The Point, to the east of the study area, and the Salem/Peabody border, have also been targeted as areas for future growth and development.

C. DEVELOPMENT OF 2035 TRAFFIC VOLUMES

The 2035 traffic volumes were forecasted by reviewing developments included within the CTPS model, applying growth rates from the regional traffic demand model, and adding expected traffic associated with other noted developments to the roadway network. A memorandum provided by CTPS titled *Route 107 Corridor Traffic Growth Estimates* was used to determine the future traffic growth rates to be applied to existing traffic volumes throughout the study area. Traffic growth rates from the regional traffic demand model for projection from the existing year

2015 to the future year 2035 were provided for the three segments of the study area noted here and depicted in Figure IV-3:

- Western Avenue from Chestnut Street to the Lynn/Salem border
- Highland Avenue from the Lynn/Salem border to the west of Willson Street
- Highland Avenue from Willson Street to Essex Street

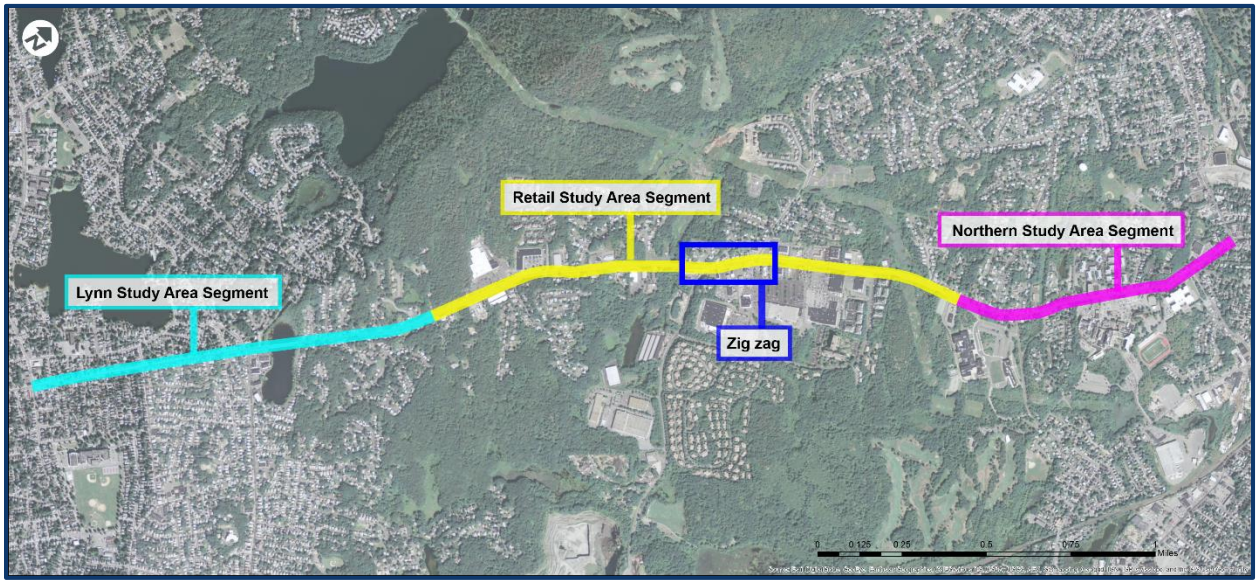


Figure IV-3: Route 107 Study Area Segments

Growth rates were provided for the weekday morning and weekday afternoon peak periods. The CTPS model did not provide growth projections for the Saturday midday peak period. Therefore, for the purpose of the study, the weekday afternoon peak period growth rates were applied to the Saturday midday peak period. The growth rates provided by CTPS and applied to the existing volumes are summarized in Table IV.1 below. These growth rates are expected to account for future traffic generators including local residential developments, the Salem Hospital expansion, and Swampscott Road transfer station. The CTPS memorandum is provided in the Appendix of this report for reference.

Table IV.1: Peak Period Traffic Growth (2015-2035)

Route 107 Corridor Sections	AM	PM	SAT
Western Ave in Lynn	2.0%	2.0%	2.0%
Highland Ave (west section)	2.0%	3.0%	3.0%
Highland Ave (east section)	6.0%	5.0%	5.0%

The regional traffic model did not account for the trips associated with the proposed Cinemaworld Complex. After the growth rate was applied to the study area intersections, the traffic volumes provided in the Cinema Traffic Impact Study were distributed to the study area roadways.

The resulting traffic volumes represent the 2035 future conditions which are depicted in Figure IV-4 for the weekday morning, weekday afternoon, and Saturday midday peak hours, respectively.

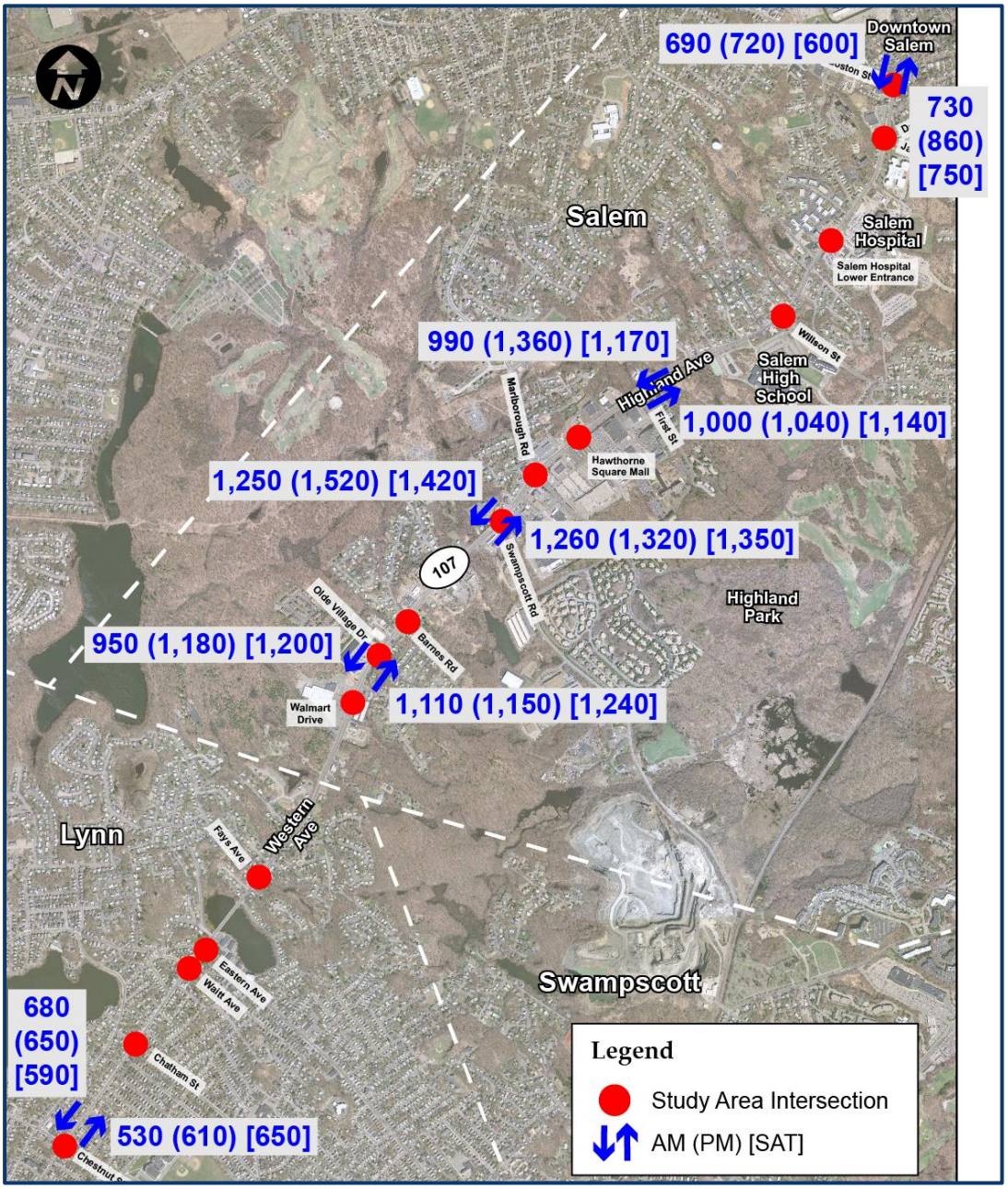


Figure IV-4: Future Vehicle Counts

V. IMPROVEMENT ALTERNATIVES DEVELOPMENT AND ANALYSIS

A. INTRODUCTION

The previous chapters of this study presented the goals and objectives, a review of existing conditions and transportation issues and concerns. The following chapter documents the iterative process of developing specific roadway and intersection improvements to address the issues and concerns while pursuing the study goals and objectives. The steps taken to develop multi-modal improvements for the Route 107 study area are also documented in the chapter below.

B. ALTERNATIVE DEVELOPMENT APPROACH AND PROCESS

Based on the work and outputs of the existing conditions review, the public outreach survey and the Working Group discussions, concepts and ideas for improving the Route 107 study area were developed. The Route 107 Study was tasked with evaluating opportunities to improve all modes of transportation including vehicles, pedestrians, bicyclists and transit users. The concepts developed in this process present the opportunity to improve operations and potentially change the general atmosphere of the roadway. The process of developing and evaluating these alternatives is outlined below:

- Review existing conditions, survey results & Working Group input
  - right-of-way constraints
  - multi-modal accessibility & connectivity
  - environmental constraints
  - vehicular operations
  - survey results working group feedback
- Identify study area-wide improvements to meet corridor goals
- Discuss with Working Group and get feedback
- Evaluate feasibility
- Select preferred alternative

Based on the steps outlined above, a preferred alternative was ultimately selected. The preferred concept includes both study area-wide and intersection specific improvements for implementation along the Route 107 study area and is discussed in further detail below.

C. IMPROVEMENT ALTERNATIVES

1. STUDY AREA-WIDE IMPROVEMENTS

A number of improvements can be implemented on the entirety of the Route 107 study area to improve operations for all modes of transportation. This section discusses the overarching improvements that were considered for the study area.

Transit Alternative Improvements

As discussed in the existing conditions chapter of this study, transit service along the Route 107 study area is primarily provided by MBTA bus routes 424, 450 and 456. In order to address identified transit deficiencies and improve transit service along Route 107, this study investigated the following summary of potential improvements:

- Alterations to frequency, and span of service
- Improved reliability
- Connectivity and transfers between bus routes
- Access to rider origins and destinations
- Visibility and marketability of bus service in the study area through improved signage, pavement markings and bus stop names
- Optimized bus stop locations, while considering local transit generators and existing bus stop amenities
- Bus stop accessibility issues including clear and level landing areas and clear zones, and sufficient bus stop length.
- Pedestrian conditions, including sidewalk, crosswalk and curb ramp access improvements
- Provision of passenger amenities such as shelters, benches, bicycle racks, and trash receptacles
- Creation of bus stop curb extensions
- Transit priority measures at intersections

Based on the potential improvements summarized above, preferred alternatives include development of a bus stop optimization plan, consideration for the addition of bus stop amenities, and signage and pavement marking improvements. Other improvements such as bus stop curb extensions, transit priority measures and provision of real-time information displays were also considered. These are not recommended at this time due to the relatively low ridership and low frequency of service within the study area.

These focused improvements were considered at the corridor-level, rather than on a segment-by-segment basis, due to the recurring issues and opportunities for improvements throughout the study area. Recommendations specific to individual bus stops are described in the following chapter.

Bus Stop Optimization Plan

The purpose of a bus stop optimization plan is to improve travel times, reliability, and accessibility of bus service, while maintaining and or enhancing access to rider destinations and amenities along the study area. Numerous factors are considered when creating a bus stop optimization plan, as outlined in Table V.1 from the MBTA Bus Stop Design Guidelines.

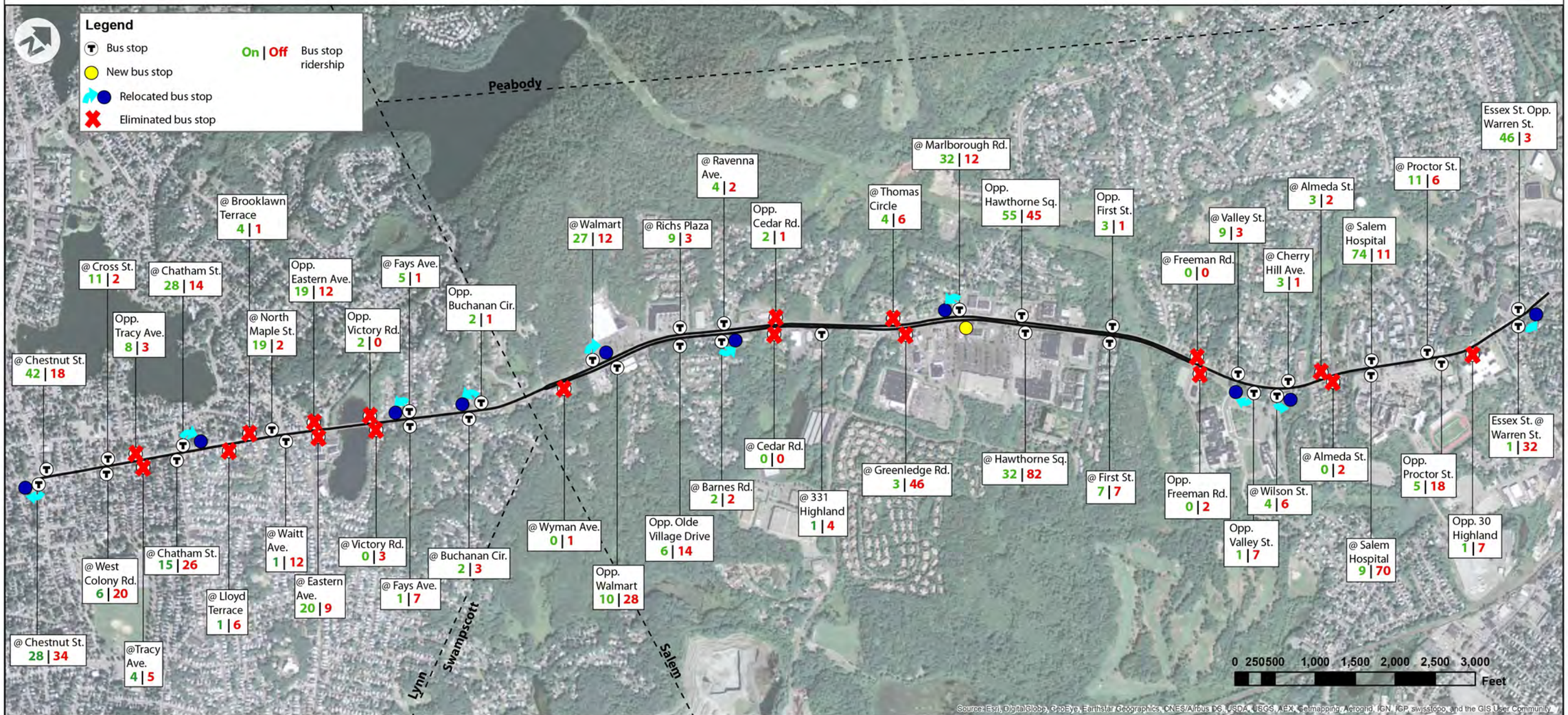
Table V.1: Bus Stop Modification Criteria

Criteria for Bus Stop Modification			
Bus Route Connections	Retain or improve connections to other bus routes.		
Ridership	Maintain high ridership stops and stops with existing amenities.	Concentration of sensitive riders.	
Access	Improve access to rider origins and destinations.		
Pedestrian Connections & Safety	Improve connections to crosswalks with curb ramps.	Consider existing sidewalk condition and network, and landing area.	Maintain stops that provide safe pedestrian crossings. Adjust stop locations that obstruct driveway access.
Spacing	Adjust bus stop spacing to meet *MBTA Bus Stop Design Guidelines*, and in consideration of local transit generators, and existing bus stop amenities.		

Source: MBTA Bus Stop Design Guidelines (2014)

A potential bus stop optimization plan is depicted in Figure V-1 and summarized in the Bus Stop Consolidation Summary Table in the Appendix. The next step recommended is a review of the plan by MBTA and a series of community meetings held to gather community input on proposed significant changes. The municipal approval process for alterations to bus stops would also need to be determined. Proposed final bus stop locations are depicted in Figure V-1. Details of the bus stop consolidation are summarized in tabular format in the Appendix.

Bus route connections were important considerations and they have been maintained or improved. Under certain circumstances the relocation of a bus stop may have increased the distance for riders transferring between routes, but the stops are still within close proximity to their former location, and thereby the added distance is minimized.



ROUTE 107 Lynn Salem
Corridor Study

Figure V.1
Bus Stop Consolidation Plan
Route 107 Corridor Study
Lynn/Salem, MA

Ridership is one of the key criteria for modifying bus stops. Low ridership is considered to be about 20% of the total ridership on a given route. Within the study area, 50% of stops have less than 10 riders per day. Existing high ridership stops are generally located in the center of retail areas, but no bus stop ridership is more than 20% of the average total. Efforts were made to retain existing bus stops with amenities.

Several bus stops are proposed for relocation or for a slight adjustment to their location in order to improve their **pedestrian connections** and/or conditions. This may include connection to improved sidewalk areas, in order to accommodate an eight-foot landing area. They may also be proposed for relocation to connect to a designated pedestrian crossing, particularly signalized crossings. Other stop locations have been adjusted to ensure that the stop is more visible, addressing safety concerns.

The proposed optimization plan reduces the overall number of stops and makes spacing more uniform, which results in the following:

- increases efficiency of the service
- reduces conflicts associated with entering and exiting bus stops
- minimizes parking impacts resulting from bus stops

The bus stop locations have been modified in consideration of the MBTA spacing guidelines provided in Table V.2. In this type of suburban area, four to five stops per mile, or one every 1,000 feet to 1,300 feet, is recommended. Currently, average spacing along the study area is about 700 feet, with about 30 stops spaced shorter than the MBTA's guidelines.

Table V.2: Bus Stop Spacing Guidelines

Bus Operating Environment	Average # of Stops per Mile	Average Distance Between Stops
Central Business District (CBD)	4-5	1,000-1,000 feet
Urban outside CBD and Key Bus Routes	4-7	750-1,300 feet
Suburban	4-5	1,000-1,300 feet
Bus Rapid Transit/Limited Stop Service	2-4	1,300-2,600 feet

Source: MBTA Bus Stop Design Guidelines (2014)

The stop consolidation plan recommends reducing the total number of stops from 52 to 35, with an average spacing of about 1,000 feet between stops. Six stops are recommended for relocation, 17 stops are proposed for removal and one new stop is recommended to be installed outside of the Hawthorne Square Mall Shopping Center, which will create an outbound stop pair for the inbound stop at Marlborough Road. Before an existing stop is relocated or a new bus stop is created, it must meet the bus stop accessibility requirements, including the presence of a sidewalk, an ADA landing area and clear zone, and adequate curb space for the stop must be provided.

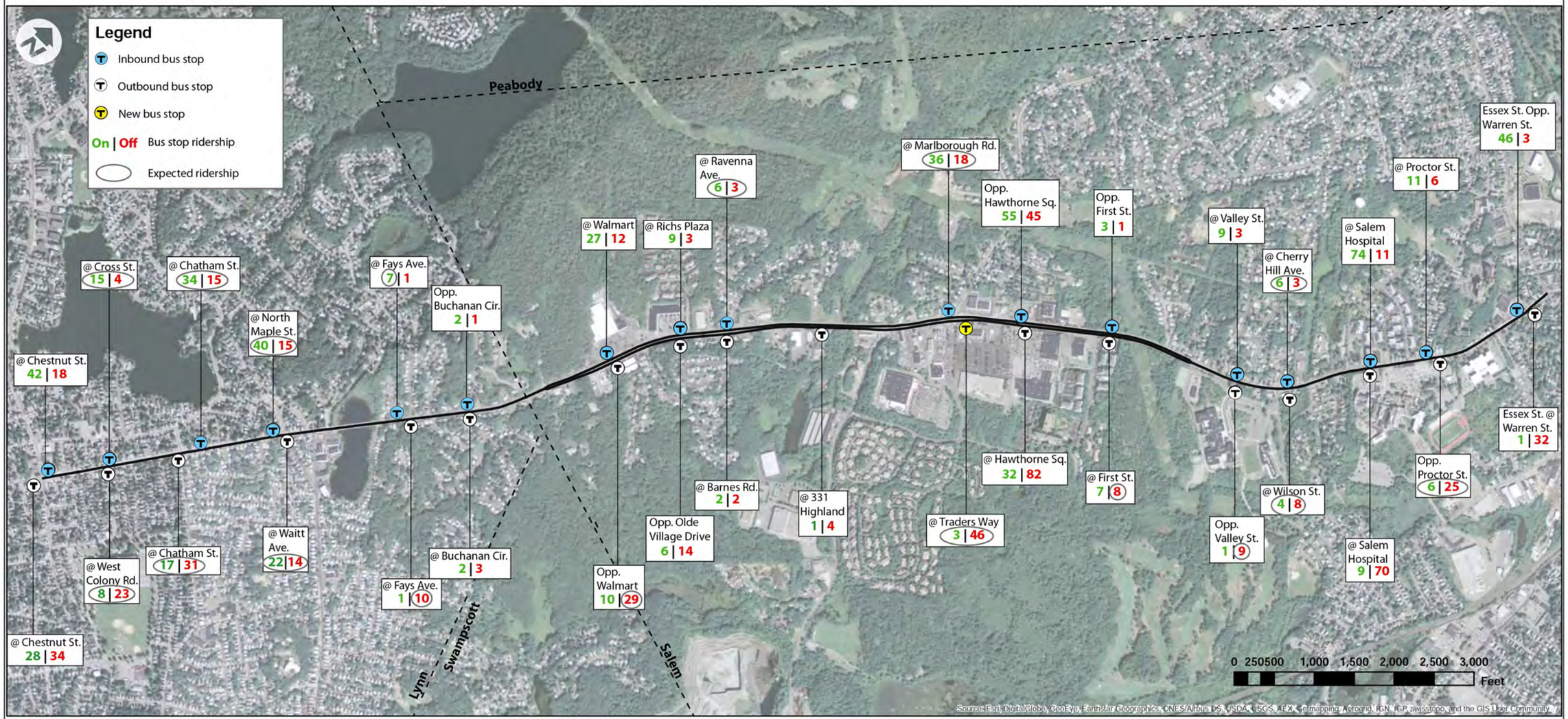
The total ridership in the study area is not anticipated to change with the implementation of the proposed optimization plan, as riders who currently use a stop that is slated for relocation or removal could walk the short distance to the next closest stop in either direction. Figure V-2 shows the final recommended bus stop locations and projected ridership at the proposed stops.

Passenger Amenity Improvements

Adding amenities, such as shelters and benches, to bus stops improves the passenger waiting experience and provides comfort and protection from the elements. Bicycle racks can provide riders with an alternative mode choice to travel the remaining distance between their origin/destination and the bus stop. Amenities can help to retain and attract additional transit riders to the service. Standardization of the amenities will provide continuity and consistency and improve the overall visual aesthetic of the Route 107 bus stops. ADA compliance is required prior to the installation of passenger amenities.

Shelters

As previously mentioned, existing shelters within the study area comprise a mix of shelter sizes and styles, although the number of stops at which shelters are provided is rather limited. The installation of shelters at more stops with significant ridership, and stops serving sensitive land uses should be explored. The size and style of shelters pursued will largely be dependent upon the amount of available sidewalk space. Standard shelters are typically five feet deep, but narrower shelters, two to three feet deep, are available with full size roofs. The length of shelters is more variable. Shelters can include lighting, powered by a direct connection, battery or solar energy. Customer service information, including maps and schedule information should also be integrated. New shelters can be standard or custom designs, and advertising panels offer revenue options.



ROUTE 107 Lynn Salem Corridor Study

Figure V.2
Proposed Final Bus Stop Location Plan and Projected Ridership
Route 107 Corridor Study
Lynn/Salem, MA

Benches

Freestanding benches are a relatively low-cost bus stop amenity that can provide riders with an improved level of comfort, especially on bus routes with low frequency and low ridership. Benches are relatively easy to install and more easily accommodated on narrower sidewalks, where a shelter might not be feasible. The size of the bench could still vary to provide seating between one and four seats.

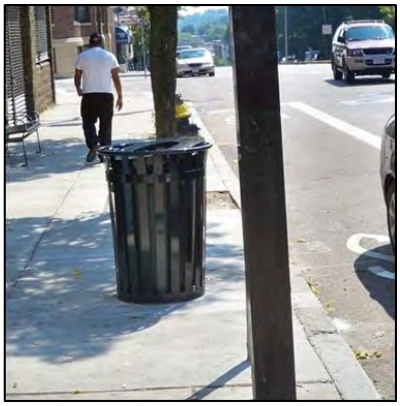
Benches at an MBTA bus stop in Brookline.

Simme Bus Stop Seat (http://simmeseat.com/portfolio/pairedseats/).

The orientation of benches is an important consideration, so as to allow users a view of the oncoming bus. Considerations when selecting the position of the bench within the sidewalk space include user safety, maintenance of a five-foot clear zone, and view sheds.

Trash Containers

Only one container for trash management is provided along the study area, at the Salem Hospital outbound stop; however, it is not affixed to the sidewalk. The addition of trash/recycling receptacles, and or trash/recycling solar compactors should be explored, particularly at higher ridership stops, and at stops close to retail. Solar-powered compactors can be Wifi-enabled and notify refuse collection departments when the receptacle needs to be emptied.

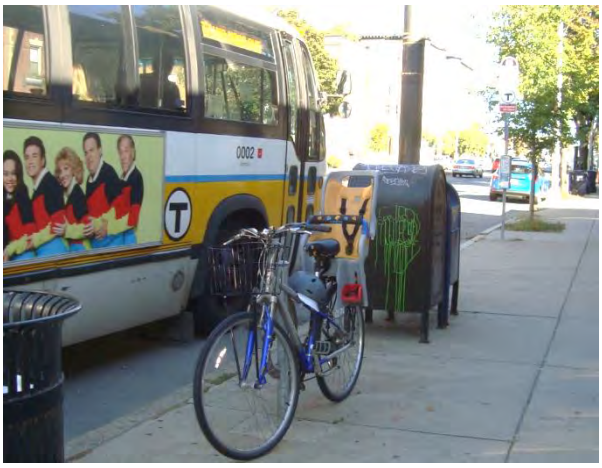


Improved amenities for trash management, including solar powered trash receptacles.

Trash containers should be sited in shady areas away from seating areas, but in close proximity to boarding/alighting areas.

Bicycle Racks

The installation of bicycle racks at bus stops would expand rider connections to and from origins/destinations outside of the study area and can incentivize transit users to ride their bicycle to access transit. Furthermore, they provide a bicycle parking option for riders if the bicycle rack on the bus is already at capacity.



Bike rack at a bus stop on Mass Ave in Cambridge.

Bus stop signs and pavement markings

All bus stops should be anchored with at least one bus stop sign at the front of the stop. In parking areas within the Route 107 study area bus stop signs should be provided at both the front and the rear of the bus stop zone, to clearly delineate the bus stop and no parking area. The appropriate bus stop lengths for locating signs are provided in Table V.3. Newer MBTA bus stop signs indicate the $100 fine for illegal parking in a bus stop. All bus stop signs should be updated to meet current MBTA standards shown in Figure V-4, which include sign reflectivity for better night time visibility, and include the bus stop ID number, which passengers can use to call, text, or use with a mobile app to obtain real-time information.

Bus stop pavement markings could be added to enhance the visibility of bus stops for bus drivers and riders, and re-inforce the bus stop zone in on-street parking areas. Pavement markings consistent with MBTA standards, as shown in Figure V-3 would be preferred. Markings should be adjusted accordingly when bus stops are located adjacent to bicycle accommodations.

Table V.3: Bus Stop Lengths

Stop Placement	40’ Bus		60’ Bus	
	Standard	Minimum	Standard	Minimum
Near-side	100’	90’	120’	110’
Far-side	90’	70’	110’	90’
Far-side, after left turn	120’	100’	140’	120’
Midblock	120’	100’	140’	120’

Source: MBTA Bus Stop Design Guidelines (2014)

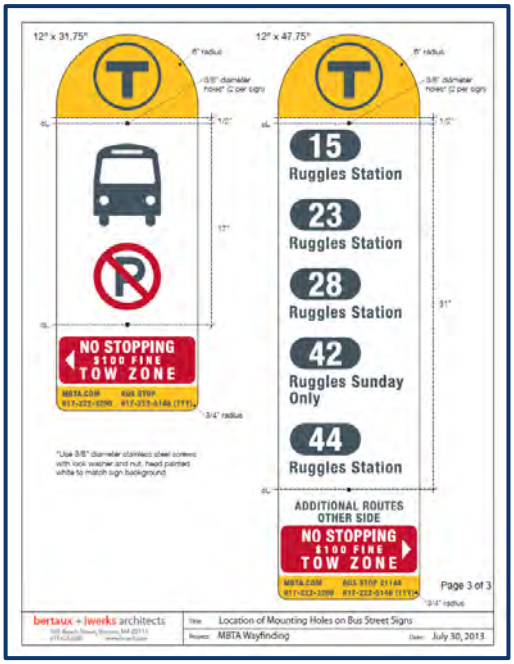


Figure V-4: Current MBTA Bus Stop Sign Standard

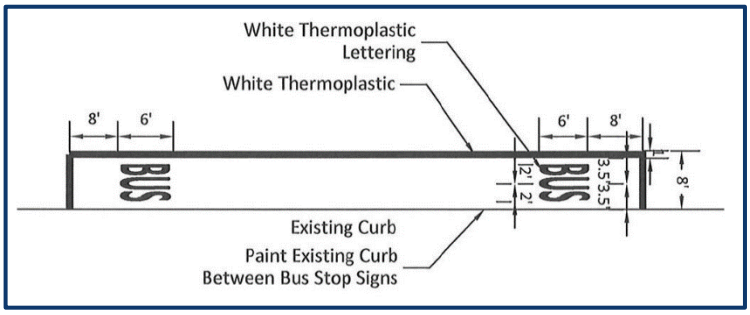


Figure V-3: Bus Stop Pavement Markings Detail

Pedestrian Improvements

Although some of the existing study area has sidewalks, much of Route 107 lacks an ADA compliant path on both sides of the roadway. In order to achieve an improved experience for pedestrians along Route 107, the following improvements have been explored as part of this study.

- Proposed sidewalks where none exist today
- Wider sidewalks where the right of way allows
- ADA compliant curb ramps at intersections and crossings
- Improved unsignalized crossings
- Curb extensions
- Crosswalks at signalized intersections
- Countdown pedestrian signal heads
- Accessible pedestrian signal push buttons

Improved pedestrian facilities will also improve transit connectivity and overall user experience. Implementation of additional elements such as traffic calming, gateways, and roadway landscaping are expected to further improve safety and the overall pedestrian experience. Figure V-5 depicts potential locations for implementation of various traffic calming techniques.

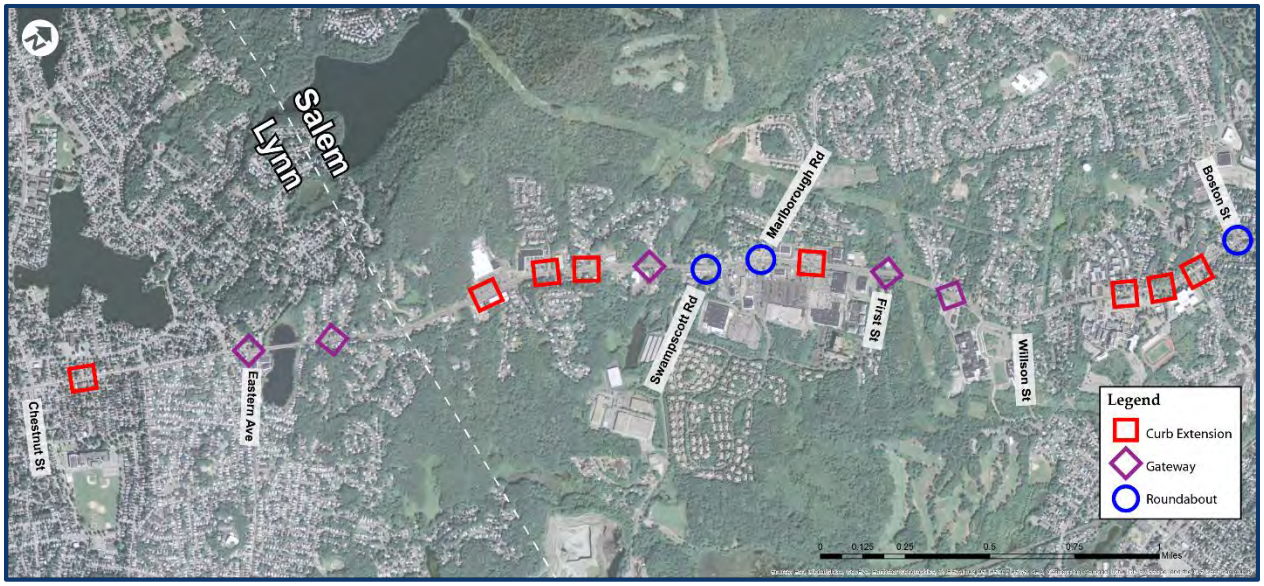


Figure V-5: Route 107 Potential Pedestrian Improvements

Curb extensions would shorten crossings for pedestrians and could also facilitate bus stops by providing additional waiting area and room for transit amenities. Gateways are designed to call attention to a roadway transition and can include a range of options such as curb extensions, roundabouts, signage and landscaping.

Bicycle Improvements

Within the study area, Route 107 does not currently provide separated facilities for bicycles. With the lack of separated facilities and high vehicle speeds, bicyclists on the roadway experience a high level of traffic stress (LTS) for the entirety of the study area. LTS for bicycles rank from 1 to 4, with LTS 4 being the worse. In order to reduce the LTS from its current ranking of LTS 4 along Route 107, the following bicycle improvements were investigated:

- Separated bicycle lanes
- Shared use paths

Separated Bicycle Lanes

Shared Use Paths

Separated bicycle lanes often result in LTS 1 or 2, depending on separation from vehicular traffic and intersection configuration. The lanes can be one-way or two-way, and should be continuous to provide for a uniform application and use along the roadway. The bicycle lanes can be separated by curbs, raised medians, parking lanes or bollards. Shared use paths are classified as off road facilities that provide a shared space between both pedestrians and bicyclists. With the physical separation from the roadway, this type of facility results in LTS 1. Consolidating pedestrian and bicycle facilities may provide for more opportunity for landscaping within the right-or-way or additional separation from vehicular traffic. Adjacent to parking, consideration should be given to additional buffer space. Dooring, when a car user opens their door into the bicycle lane, striking a bicyclist, can be prevented by adding a protected buffer space between the bicycle lane and parking lane. Additionally, on roadways with heavy truck traffic, adding a buffer between the bicycle lane and travel lane will increase the safety and comfort of bicyclists.

Vehicular Improvements

Extensive queuing and high delay is experienced by vehicles within the Route 107 study area under existing conditions. The study seeks to improve these traffic operations by implementing some of the following roadway enhancements:

- Revised cross-sections
- Evaluation of on-street parking
- Traffic calming
- Access management
- Traffic signals
- Roundabouts
- Exclusive turn lanes
- Signal timing, phasing and coordination improvements

The study area intersections of Route 107 at Eastern Avenue/Stanwood Street and Route 107 at Salem Hospital Lower Driveway were evaluated for the installation of traffic signals. Route 107 at Eastern Avenue/Stanwood Street was considered in conjunction with the signal at Maple Street/Waitt Avenue. By utilizing the connection at Maple Street/Waitt Avenue, the westbound left turn from Eastern Avenue onto Route 107 could be re-routed to Maple Street/Waitt Avenue. The Working Group identified the lower driveway to Salem Hospital as a potential location for a traffic signal.

The intersection of Swampscott Road at First Street was also evaluated for signal installation, since this intersection was considered as part of the zig zag analysis.

To improve cross-connection access, potential turning lanes were investigated. Exclusive left turn lanes were investigated on all approaches to the Route 107 intersections with Chestnut Street, Chatham Street, and Maple Street/Waitt Avenue. A southbound left turn lane was investigated for Route 107 at Eastern Avenue, at Willson Street, and Salem Hospital Lower Driveway. At Willson Street, an exclusive northbound right turn lane was also considered.

Modern roundabounts were considered within the study area to promote efficient traffic circulation and introduce traffic calming elements to the study area. Roundabouts were considered for the Route 107 intersections at Swampscott Road, Marlborough Road, and Boston Street/Essex Street.

As with any review of alternatives, there are trade-offs between the different concepts for each mode of transportation. The following sections describe a more specific application of the improvements outlined above and how the implementation of each improvement may affect the multimodal operations of Route 107.

As discussed in the existing conditions review, the Route 107 study area has been broken in three primary roadway segments (and one sub-segment) in order to more easily discuss potential improvements as they apply to the different segments of the roadway. The discussion of alternatives are broken into the roadway segments as depicted in Figure V-6.

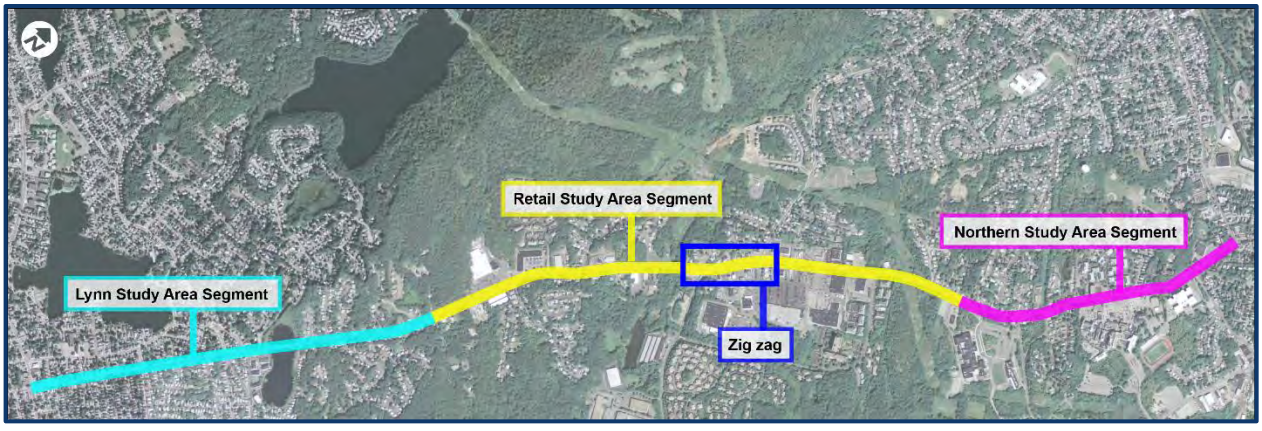


Figure V-6: Route 107 Roadway Segments

For each roadway segment, a series of roadway cross-sections have been considered. As depicted in Figure V-7, the roadway cross-section consists of the components of the roadway and may include:

- Vehicle travel lanes
- Parking
- Pedestrian facilities
- Bicycle facilities
- Medians
- Landscaping

Figure V-7: Cross-Section Elements

The pros and cons of the cross sections considered are identified in the following discussion. In developing the cross-sections, efforts were made to balance the transportation modes, to remain within the existing right-of-way, and to reflect the specific desires of each roadway segment. The existing right-of-way varies along Route 107 as shown in Figure V-8.

Figure V-8: Existing Right-of-Way Along Route 107

2. LYNN STUDY AREA ALTERNATIVES

In the Lynn study area segment of the study area, there is a 66-foot wide right-of-way in which Route 107 currently consists of one 15-foot travel lane in each direction, an eight-foot parking lane in each direction, and ten-foot sidewalks on both sides of the roadway. Efforts were made to maintain parking in this segment and to add bicycle accommodations. This segment of the study area is under the City of Lynn's jurisdiction from Chestnut Street to the southern end of the Buchanan Bridge before falling under MassDOT jurisdiction northwards to the Lynn/Salem line.

In order to accommodate a proposed bicycle facility, bicycle lanes, buffered bicycle lanes and a two-way separated bicycle lane were explored. However, the narrow right-of-way combined with the desire to maintain parking limited the range of bicycle amenities that could reasonably be added. By narrowing the travel and parking lanes, a narrow bicycle lane is able to fit within the existing curb-to-curb cross-section. To add a protected buffer to the bicycle lane, providing an added level of safety and comfort, on-street parking on one side of the roadway would need to be eliminated. To provide a two way separated bicycle lane with adequate separation between cyclists and pedestrians and cyclists and vehicles, both existing lanes of on-street parking would need to be eliminated. While this level of separation would create the most comfortable bicycle environment, the consequential impacts to parking were considered too severe for this roadway segment.

The pedestrian improvements in this segment were focused upon the following:

- Maintaining an ADA compliant path for the entirety of the segment
- Providing accessible curb ramps at intersections and crossings
- Providing crosswalks at all signalized intersections
- Improving unsignalized crossings
- Reevaluating signal timings to accommodate up-to-date pedestrian phase timings.

From a traffic operations perspective, two travel lanes are generally sufficient. However, left turn lanes are desirable at key intersections to improve safety conditions. Variations of travel lane widths were considered. Roadway modifications such as exclusive turn lanes, access management, improved intersection geometry and a review of existing and potential traffic signals were explored to enhance safety and operations within this segment of Route 107.

Many of the intersections within the Lynn study area segment are narrow and tight, creating issues for larger vehicles traveling along and turning to and from Route 107. In order to improve this configuration modifications at intersections such as repositioning stop bars, eliminating parking in close proximity to intersections and providing exclusive turn lanes were considered. The addition of the turn lanes would be expected to reduce the number of sideswipe collisions from vehicles attempting to pass on the narrow roadway and improve visibility of turning vehicles potentially reducing the number of angle collisions. Figure V-9 depicts the locations along the Lynn segment which were reviewed for the potential implementation of exclusive left-turn lanes. The intersection improvements are discussed in more detail in Chapter VI.

The existing signalized intersections along the Lynn segment were reviewed to identify improvements that could be proposed to improve traffic operations and safety including revised clearance intervals, updated phasing and improved traffic signal coordination. Updated clearance intervals are expected to help reduce the number of crashes occurring between conflicting movements by giving vehicles adequate time to complete movements at the end of a phase before the next conflicting phase starts. With the potential implementation of left-turn lanes at the signalized intersections, the phasing at each of the signalized intersections needed to be reviewed and updated accordingly. Based on a review of the existing signal operations, it was found that the coordination along Route 107 between the existing traffic signals could be improved to help manage queues along the study area.

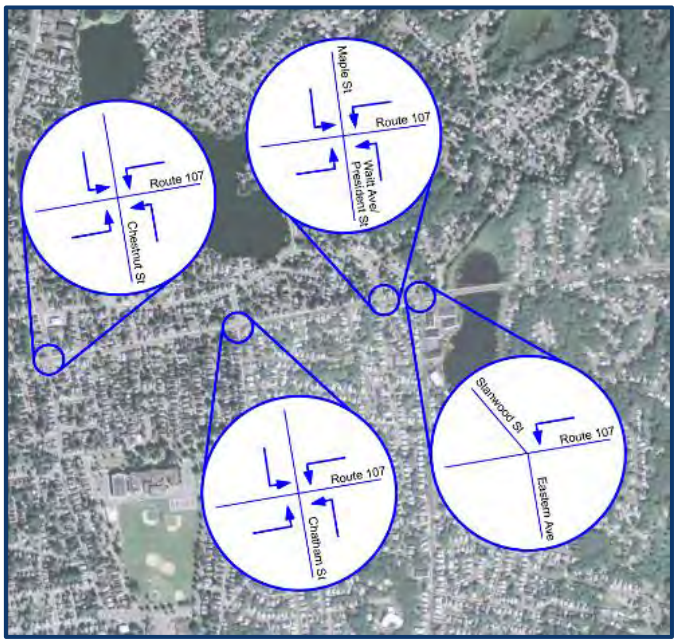


Figure V-9: Potential Implementation of Exclusive Left-Turn Lanes (Southern Corridor)

The intersection of Route 107 and Eastern Avenue/Stanwood Street was identified as a key location for improvements within the Lynn study area segment. The unsignalized intersection experienced a high number of crashes, many to do with poor sight lines for the minor road approaches and the unconventional offset of the minor roads at Route 107. In order to alleviate some of the existing safety issues a number of improvements were investigated included the following:

- Prohibit Eastern Avenue left-turn movements due to impeded sight lines
- Reconfigure Stanwood Street to be one-way, redirecting traffic to the Maple Street intersection
- Signalize the intersection of Route 107 and Eastern Avenue/Stanwood Street
- Prohibit northbound and/or southbound left-turns from Route 107
- Provide an exclusive left-turn lane for southbound Route 107 approach

Figure V-10 and Figure V-11 depict two potential concepts of the combined improvements expected to make the most significant improvements to the safety and operations at the intersection of Route 107 and Eastern Avenue and Stanwood Street.

Figure V-10: Combined Improvements Concept 1

Figure V-11: Combined Improvements Concept 2

Potential Roadway Cross-sections – Lynn Segment

After reviewing the existing issues within the Lynn study area segment and identifying potential improvements for each mode of transportation, a number of potential roadway cross-sections were identified. The following section describes the potential cross-sections and the issues and opportunities associated with each.

The first potential cross-section investigated for the Lynn study area segment of Route 107 included sidewalks, a two-way separate bicycle lane, landscape buffer and a travel lane in each direction, as depicted in Figure V-12.

Opportunities

- Full separation of bicycles from vehicles and pedestrians
- Additional pedestrian separation
- Additional green space

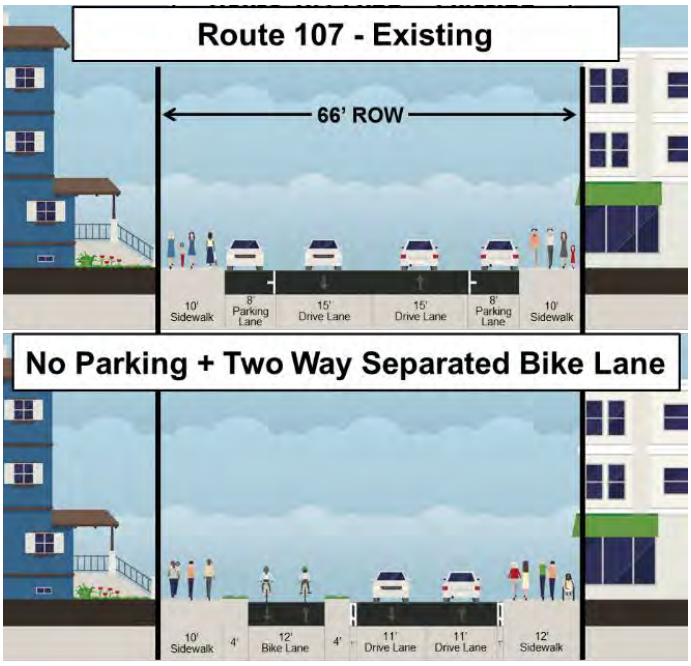


Figure V-12: Potential Cross-Section – No Parking + Two Way Separated Bike lane

Issues:

- Removal of parking on both sides
- Loss of up to 145 spaces
- Change in curb line required to accommodate proposed left-turn lanes

The next cross-section explored as part of the study included the elimination of parking on one side of the street to accommodate a protected buffered bicycle lane in each direction, as depicted in Figure V-13.

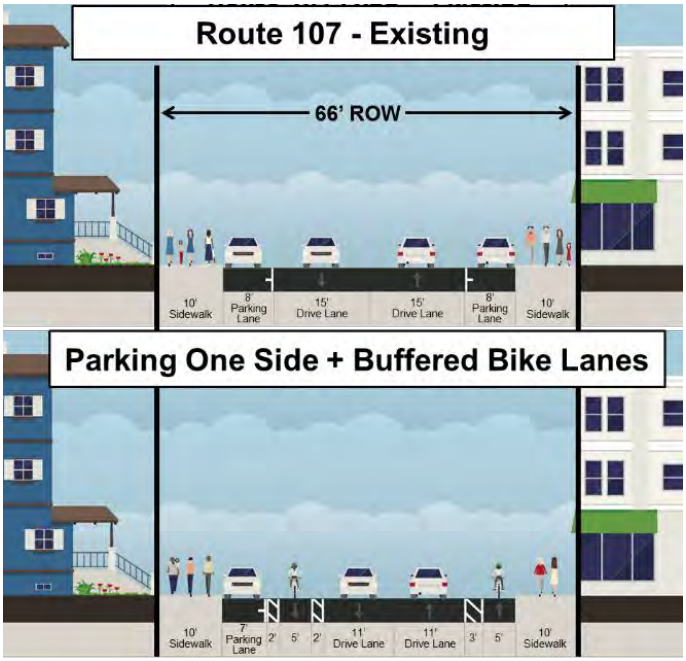


Figure V-13: Potential Cross-Section – Parking One Side + Protected Buffered Bike Lanes

Opportunities:

- On street protected buffered bicycle lane
- Ability to provide left-turn lanes at intersections

Issues:

- Removal of parking on one side
- East side – loss of up to 80 spaces
- West side – loss of up to 65 spaces
- Narrow bicycle lane
- Narrow protected buffer between bicycle lane and parking lane

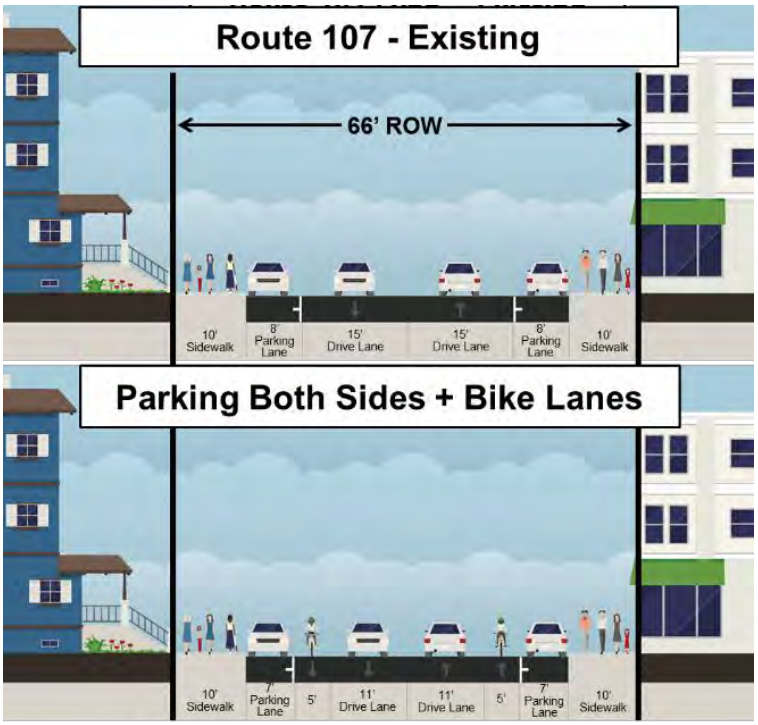


Figure V-14: Potential Cross-Section – Parking Both Sides + Bike Lanes

The loss of parking on Route 107 through the Lynn study area segment was noted to be a significant disadvantage to moving these alternatives forward.

The final cross-section investigated for the Lynn study area segment of Route 107 included sidewalks, on-street parking on both sides, a narrow bicycle lane and a travel lane in each direction, as depicted in Figure V-14.

Opportunities

- Maintain existing parking both sides
- Ability to provide left-turn lanes at intersections
- Maintain existing sidewalk

Issues:

- Narrow on street bicycle travel
- No buffer between bicycles and parking or travel way
- High level-of-traffic stress for bicyclists
- The available 66 feet of right-of-way for potential improvements limits the space available to multimodal improvements. Maintenance of parking on both sides of the street was noted by the Working Group as an important feature to keep as part of the proposed improvements. The group generally agreed that it was very important to maintain parking on both sides of the roadway.

3. RETAIL STUDY AREA ALTERNATIVES

The segment of Route 107 from the Lynn/Salem city line to Freeman Street has been defined as the retail study area segment. Route 107 is under MassDOT jurisdiction in this segment (upwards to Greenway Road) with approximately 90 feet of available right of way. The available width creates a number of opportunities for implementing multi modal improvements. The roadway segment between Swampscott Road and Marlborough Road, which is commonly referred to as the "zig zag" due to east-west traffic movements accomplished via Route 107, is specifically discussed in more detail.

Currently this portion of Route 107 consists of four 12-foot travel lanes (two lanes in each direction) and a seven-foot wide median. On the east side of Route 107, there is a seven-foot shoulder and when a sidewalk is present it is generally ten feet in width. On the west side of the roadway there is a ten-foot shoulder and an eight-foot planting strip. Turn lanes are generally provided at key intersections.

The high traffic volumes and the number and placement of signalized intersections in this portion of Route 107 necessitate the four travel lanes, as reduction to two travel lanes would result in excessive delays and long queues at the key intersections.

Various bicycle amenities were considered in this segment of Route 107 including separated bicycle lanes, protected buffered bicycle lanes and a shared use path.

For pedestrians, efforts were made to complete the sidewalk system and provide sidewalks on the west side of the roadway, where they currently lack today. In addition to proposed sidewalks, the following would also be included in the potential pedestrian improvements:

- Maintaining an ADA compliant path for the entirety of the segment
- Providing accessible curb ramps at intersections and crossings
- Providing crosswalks at all signalized intersections for all approaches
- Improving unsignalized crossings
- Reevaluating signal timings to accommodate up-to-date pedestrian phase timings

First Street

At the intersection of Route 107 at First Street, north of the Hawthorne Square Mall Shopping Center, the Working Group identified the desire for an improved pedestrian connection across Route 107. There is currently a food pantry on the eastern side of Route 107 that is served by bus stops on both sides of the road. Unfortunately, there is a median dividing the roadway that prevents pedestrians from crossing to the western side of the roadway to catch the bus. An enhanced pedestrian crossing was investigated and it was determined that a median with flashing beacons would provide a safe crossing opportunity for pedestrians. By reviewing bus stop ridership information and nearby pedestrian volumes, it was determined that a high-intensity activated crosswalk beacon (HAWK) signal was unnecessary for the current level of

pedestrian demand. After the crossing is implemented, a future study could determine if pedestrian demand has risen and a HAWK signal is required.

A number of alternatives were reviewed in order to identify if vehicular roadway capacity could be reallocated to other modes to change the overall character of the roadway. The following vehicular improvements were investigated:

- Maintenance of existing turn lanes
- Queue management
- Maintenance of median openings
- Review of additional access across Route 107
- Landscaped median and removal of guard rail to calm traffic
- Improved lane reduction at the Lynn/Salem city limit
- Improved signal coordination
- Improved signal timings, phasing and clearance intervals

Collectively, the investigation of each of these types of improvements resulted in the potential cross-sections discussed in the following section.

Potential Roadway Cross-sections – Retail Segment

In order to provide a multimodal corridor that would greatly improve the experience of pedestrians and bicyclists within the retail study area segment, a cross-section was investigated to reduce vehicular capacity to one lane in each direction. As seen in Figure V-15, this creates extensive opportunity for physical separation between all modes and also provides the opportunity to beautify the study area. The eliminated roadway travel lane and shoulder area are replaced with landscaped buffers, wide bicycle lanes, and wide sidewalk areas. This helps redefine the character of the roadway resulting in lower vehicle speeds.

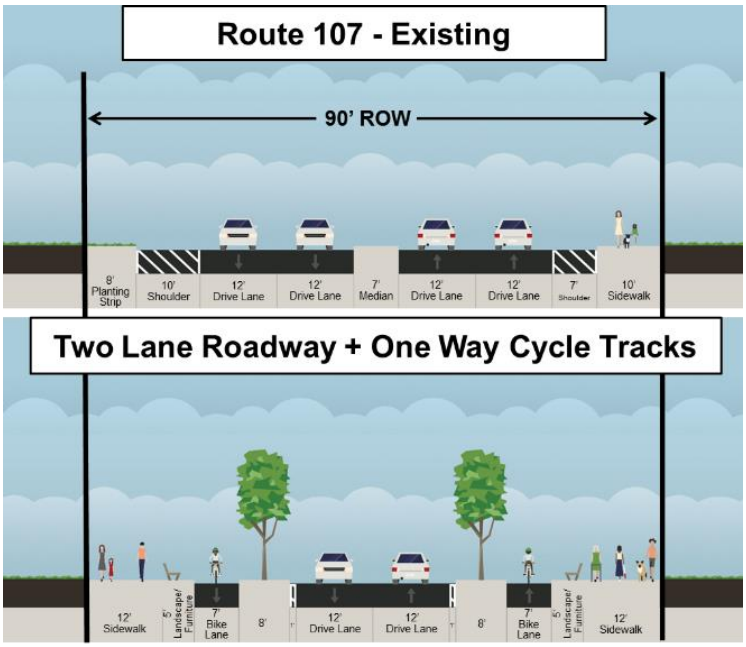


Figure V-15: Potential Cross-Section – Two Lane Roadway + One Way Cycle Tracks

Opportunities:

- Separation of all modes of transportation
- Grade separated bicycle lane
- Additional landscaping space to modify the roadway character, potentially resulting in lower vehicle speeds
- Wide proposed sidewalk on both sides of the roadway

Issues:

- Removal of vehicular capacity resulting in longer queues and excessive delays
- No separation between opposite travel lanes which may encourage additional crossover traffic from the side streets along Route 107. With the reduced capacity, the number of acceptable gaps would likely be reduced, resulting in extensive delay for unsignalized side streets and potentially creating dangerous vehicular interactions.

Due to the impacts to vehicular operations within this segment, this alternative was not selected as the preferred alternative.

The next cross-section evaluated for the retail study area segment includes maintaining the existing two travel lanes in each direction to help maintain existing traffic operations. The cross-section depicted in Figure V-16 removes the existing median in order to accommodate a wide sidewalk on one side and a shared use path on the other side with a proposed landscaping buffer.

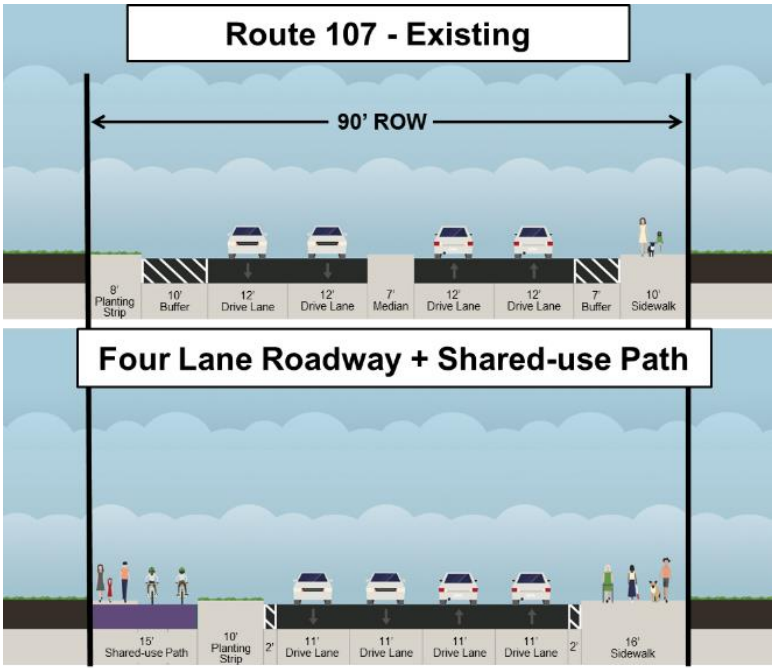


Figure V-16: Potential Cross-Section – Four Lane Roadway + Shared-use Path

Opportunities:

- Shared-use path
- Wide sidewalks
- Additional landscaping space to modify the roadway character, potentially resulting in lower vehicle speeds
- Separation between shared use path and vehicles creating a more enjoyable user experience for pedestrians and bicyclists

Issues:

- No separation between opposite travel lanes which may encourage additional crossover traffic from the side streets along Route 107, potentially creating dangerous vehicular interactions.

The final cross-section explored as part of the retail study area segment included accommodations for vehicles, pedestrians and bicyclists while maintaining vehicular operations. The proposed cross-section includes two travel lanes in each direction, separated by a planted median, a protected buffered bicycle lane in each direction and sidewalks on both sides of the roadway, as depicted in Figure V-17.

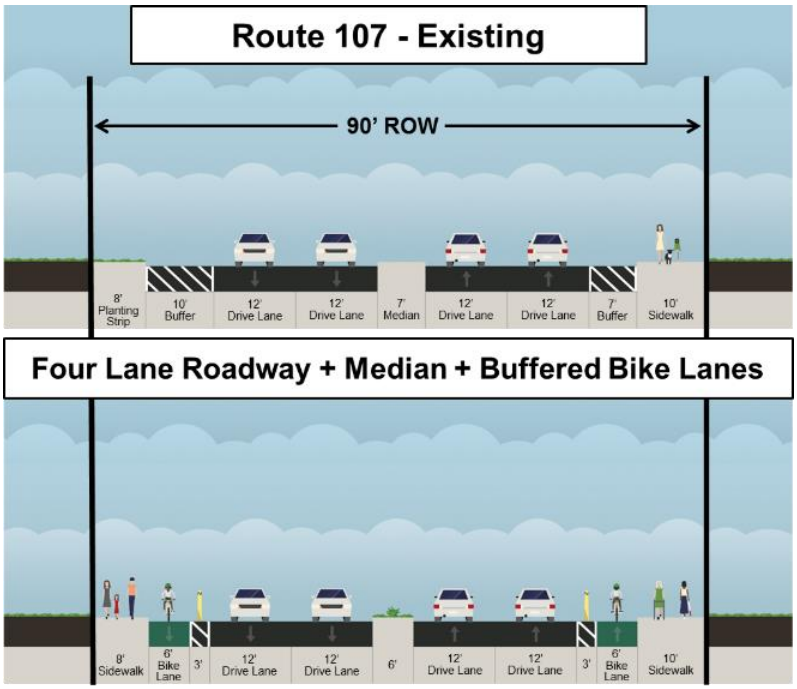


Figure V-17: Potential Cross-Section – Four Lane Roadway + Median + Protected Buffered Bike Lanes

Opportunities:

- Separation of bicycles from vehicular travel with a proposed protected buffer
- Proposed sidewalk on both sides of the roadway
- Replacement of guardrail with streetscape trees to induce traffic calming.

Issues:

- Minimal green space outside of the proposed median
- Minimal separation between pedestrians and bicyclists

The Working Group was not in favor of removing the median. The group was favorable towards changing the look of the median by removing the guardrail and adding street trees.

One topic that emerged during the public comment period was the choice between buffered and protected bicycle lanes as shown in Figure V-17. The project team showed renderings during Working Group and public meetings showing protected bicycle lanes with bollards to provide separation between bicyclists and vehicle traffic. However, the term “buffered” was used to describe the lanes, which is often interpreted as painted medians allowing for increased space between bicyclists and vehicle traffic without physical protection.

This report ultimately recommends physical separation between bicyclists and vehicle traffic as exemplified in Chapter 3.4 of the MassDOT Separated Bike Lane Planning & Design Guide. For example flexible delineator posts can be placed in the roadway as a low-cost option to provide a visible barrier between bicyclists and vehicle traffic while allowing for temporary removal for snow plowing and passing of traffic by emergency vehicles when necessary. Other options as vertical objects include planter boxes and rigid, non-removable bollards. A decision of the most appropriate type of physical protection would be determined in the design phase of a project.

To clarify, the buffered bicycle lanes presented throughout the report are intended as protected buffered bicycle lanes. An opportunity for public input on the provision and design of bicycle lanes would be available during the design phase of a project.

Zig Zag

As previously discussed, the zig zag segment refers to two intersections on Highland Avenue (Highland Avenue at Swampscott Road/Dipietro Avenue and Highland Avenue at Marlborough Road/Traders Way) and the movements between the two intersections. There is a strong desire line for vehicle connections in the east-west direction and these movements are currently achieved by using Highland Avenue for motorists to move between Swampscott Road and Marlborough Road.

Seventeen alternatives were explored to improve safety and operations for the intersections in the zig zag segment. Some of the alternatives propose diverting or rerouting traffic through two nearby intersections:

- Swampscott Road at First Street
- First Street at Traders Way

Image V.1: Instances of ledge.

The study team considered several items throughout the analysis and evaluation of the zig zag segment alternatives including traffic operations and congestion, bicycle and pedestrian accommodations, roadside constraints, adjacent land use, and impacts to adjacent properties. Study objectives focused on reducing traffic congestion, improving traffic operations, and improving safety and facilities for bicycles and pedestrians. Roadside constraints can make constructability of an alternative difficult or cost prohibitive. There are several instances of ledge throughout the zig zag segment as shown in Image V.1. There is a substantial cost to excavate ledge. At a few

locations, tall walls abut the roadway. At the Swampscott Road/Dipietro Road intersection, a neighborhood's only roadway, Thomas Circle, abuts Route 107 (Figure V-18). In addition, there is a significant grade difference between Thomas Circle and the Swampscott Road/Dipietro Road intersection making the direct connection to the intersection impossible. Impacts to adjacent properties along Route 107 may include re-grading into the property, parking space removal and building demolition. The study aimed to recommend alternatives that limited these property impacts.

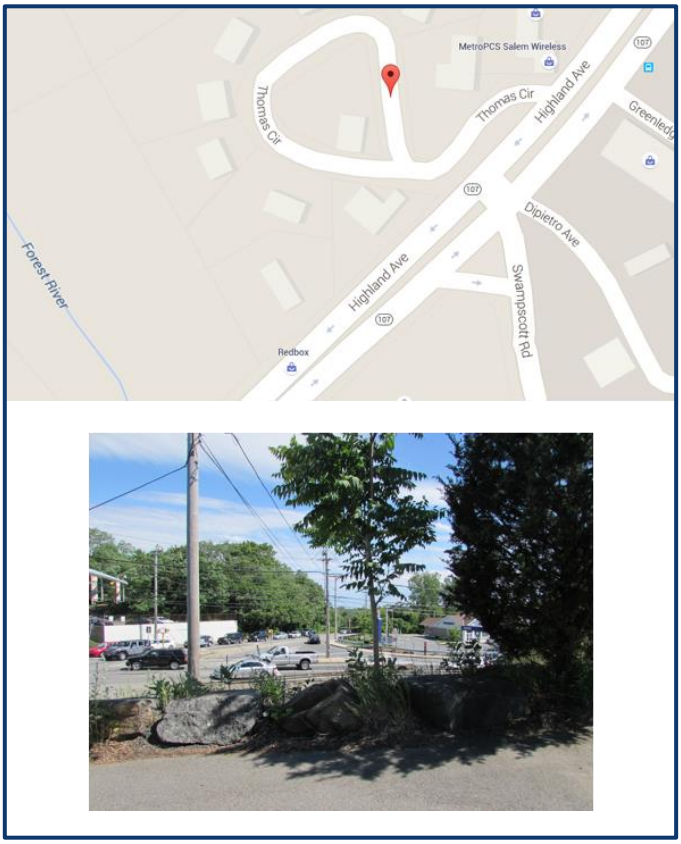


Figure V-18: Thomas Circle abuts Route 107

Some of the zig zag alternatives include the signalization of the First Street at Swampscott Road intersection. The signalization of this intersection is necessary to enhance safety and to improve operations for the alternatives with the re-routed zig zag movements. Currently the intersection is unsignalized with First Street under stop control and Swampscott Road free-flowing. Field observations during the weekday afternoon peak hour revealed that the intersection experiences large queues, long delays, and unsafe driver behavior exiting the First Street approach.

The study team evaluated the capacity of the proposed alternatives to handle the traffic volumes. The future weekday afternoon peak hour volumes were used to evaluate the scenarios because the afternoon volumes were the highest and they represented both the commuting and retail patterns on the study area.

The following is a summary of each of the zig zag alternatives considered. A detailed level of service summary (LOS) is provided in the Appendix for each of the alternatives. Note that some of the alternatives involve turn restrictions that would result in traffic being re-routed via First Street and Traders Way. Additional traffic analysis is required should these alternatives be advanced. Also, there is a local truck restriction posted on First Street, and this restriction should be reconsidered if turn restrictions are to be implemented.

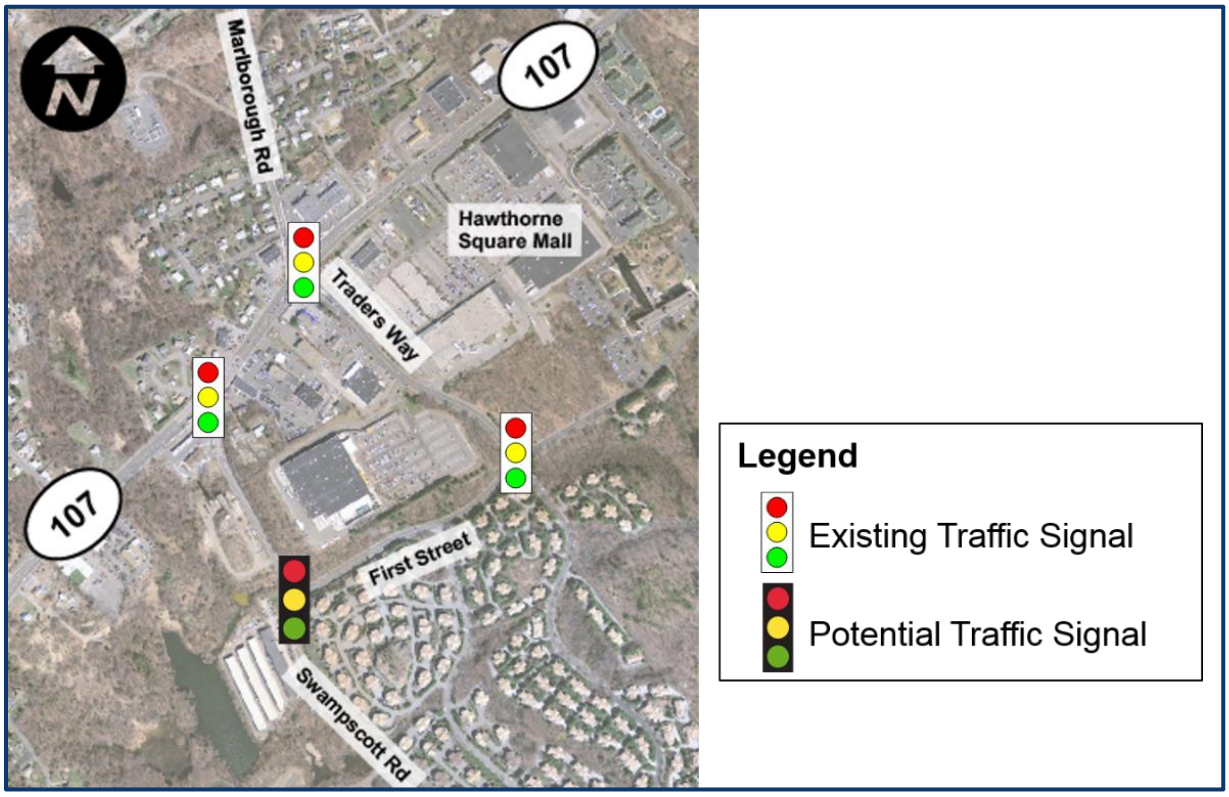


Figure V-19: Full Access

Full Access (Figure V-19)– This alternative involves adding a traffic signal at the intersection of First Street and Swampscott Road, improving signal coordination at all four intersections, and reallocation of green time to better accommodate the zig zag movement. As shown in LOS Table (Figure V-20), this option results in an overall LOS D for the Swampscott Road/Dipietro Road intersection and LOS F for the Marlborough Road/Traders Way intersection. At Swampscott Road and First Street, the LOS improved from an F to C with the signalization, which is a substantial improvement. This option would increase safety and improve operations. It is fairly simple to implement and should be considered for short-term improvements.

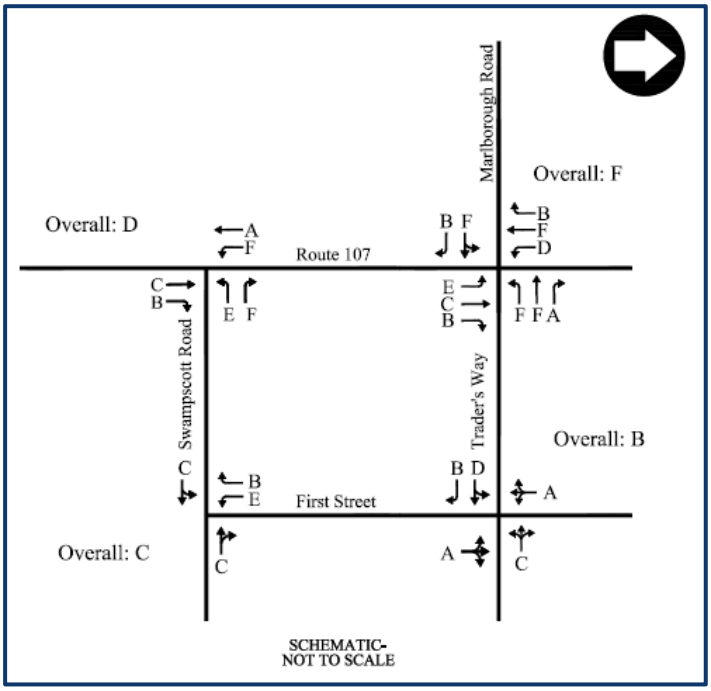


Figure V-20: Level of Service

No Left Turn onto Marlborough Road (Figure V-21) – The left turn movement from Highland Avenue onto Marlborough Road is restricted in this alternative. Motorists traveling northbound on Highland Ave to Marlborough Road would have to turn right onto Swampscott Road, left onto First Street, left onto Traders Way, then proceed straight through the Traders Way/Marlborough Road intersection. The left turn restriction results in a long alternative route as well as a large number of left turns onto First Street, and therefore, this alternative is not recommended.

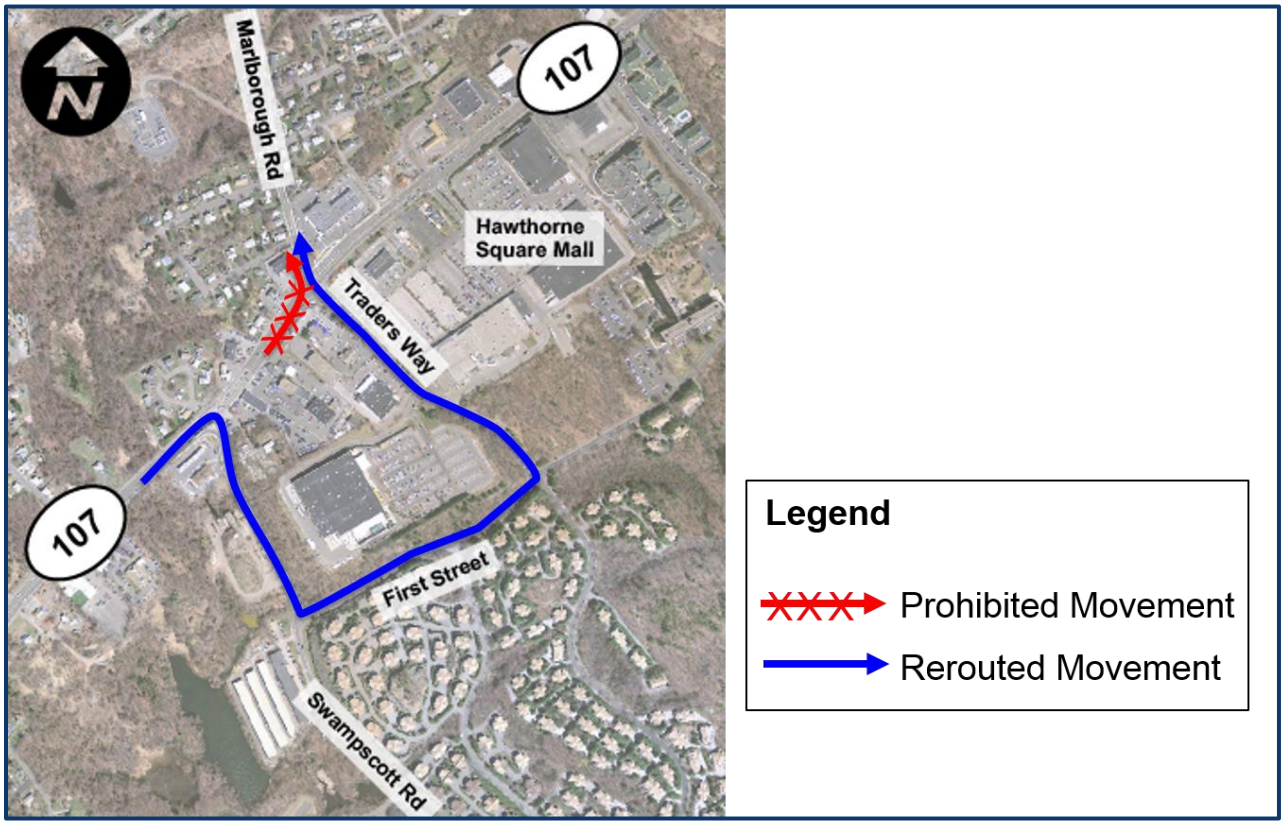


Figure V-21: No Left Turn onto Marlborough Road

No Right Turn from Marlborough Road (Figure V-22) – This alternative prohibits the right turn from Marlborough Road onto Highland Avenue. This will reroute traffic straight onto Traders Way, then a right turn onto First Street, another right turn onto Swampscott Road, followed by a left turn onto Highland Avenue. Once again, this option produces a long, alternative route for this movement. In addition, thru vehicles are added to the Marlborough Road approach. This alternative is not recommended.

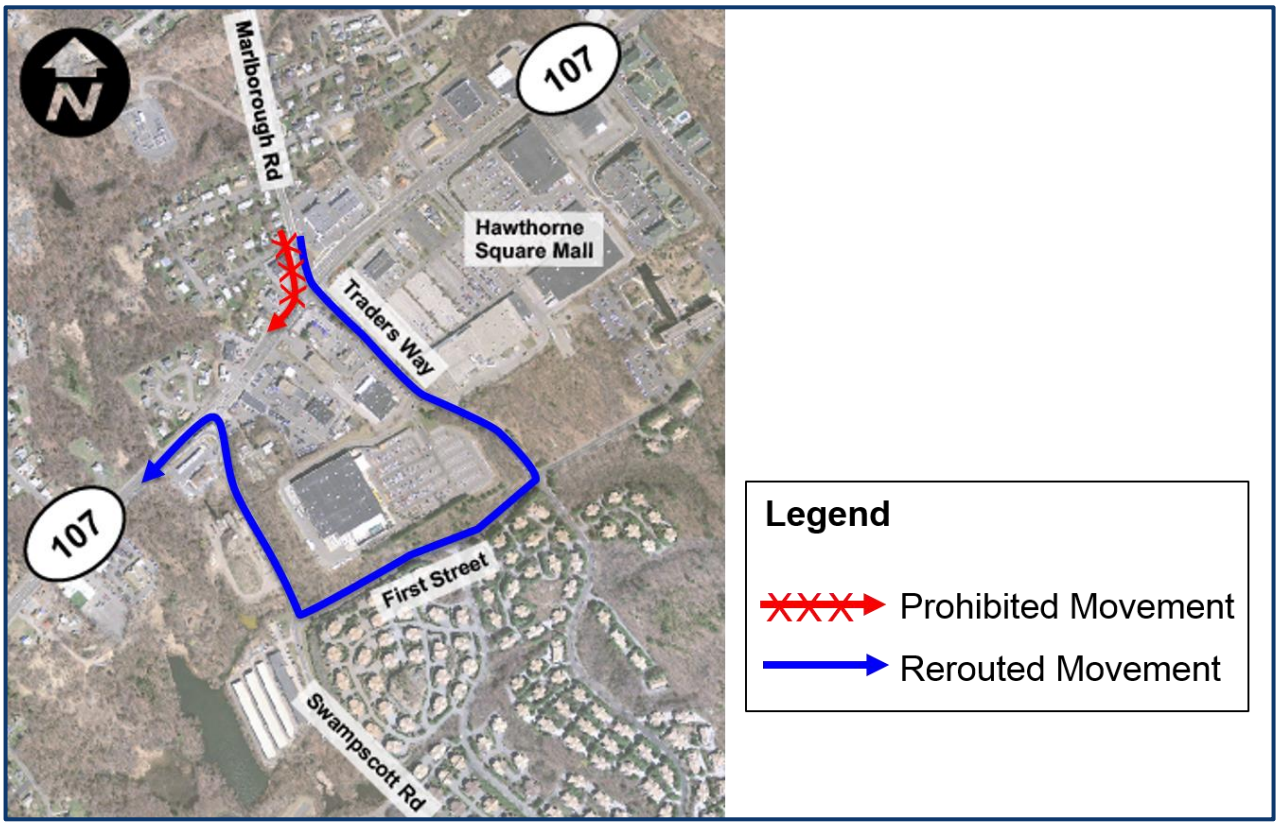


Figure V-22: No Right Turn onto Marlborough Road

No Left Turn onto Swampscott Road (Figure V-23) – The restricted movement for this option is the left turn from Highland Avenue onto Swampscott Road. Motorists wishing to travel eastbound on Swampscott Road from Marlborough Road or Highland Avenue southbound are rerouted onto Traders Way, then First Street, before turning left onto Swampscott Road. The benefit to this option is the elimination of the southbound queue at Swampscott Road. The drawback is the addition of left turns from Highland Avenue southbound to the Marlborough Road/Traders Way intersection which already operates poorly. This alternative is not recommended.

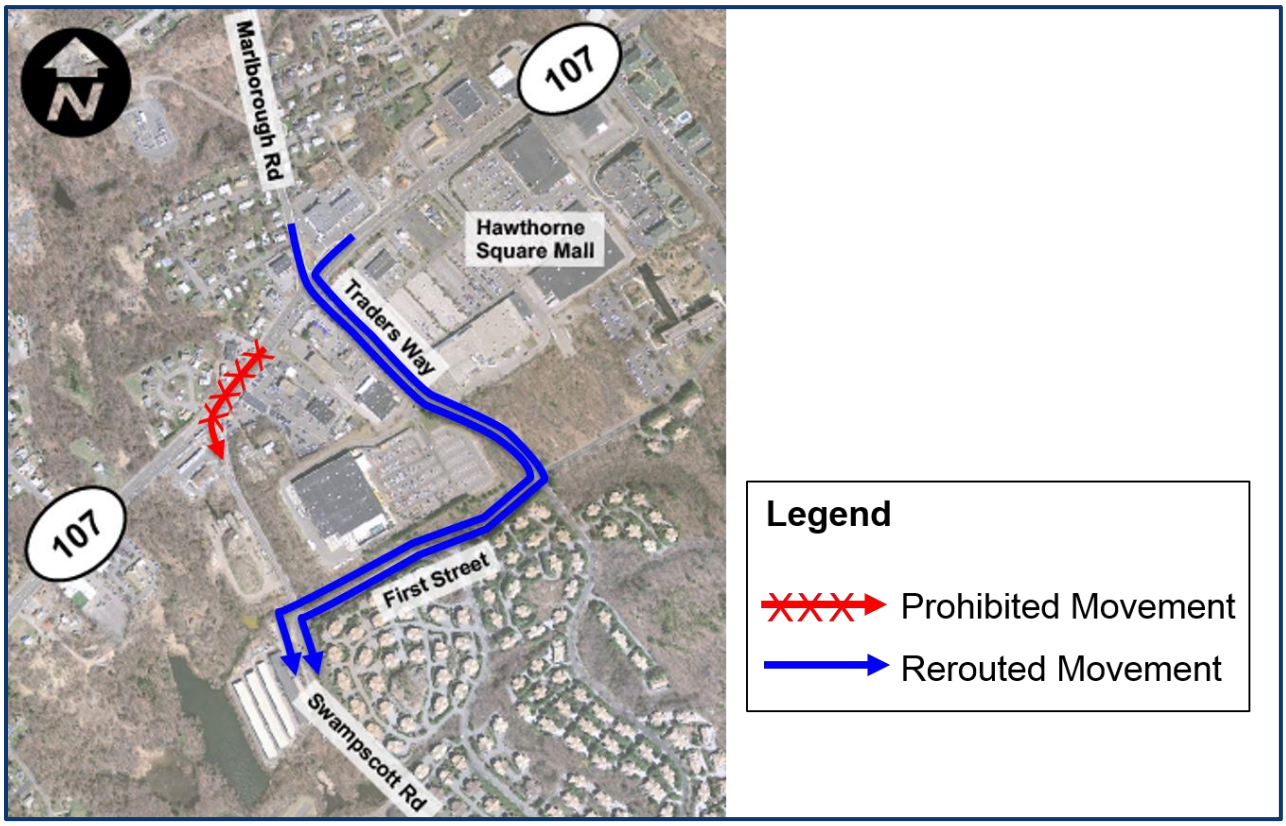


Figure V-23: No Left Turn onto Swampscott Raod

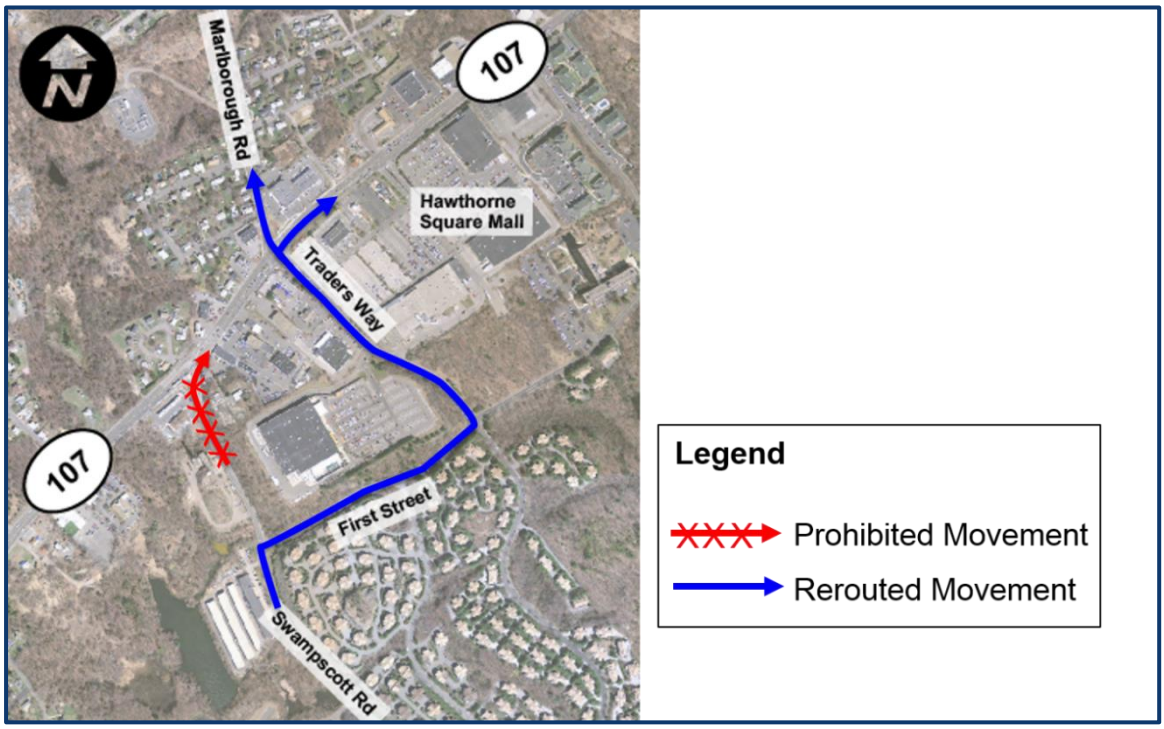


Figure V-24: No Right Turn from Swampscott Road

No Right Turn from Swampscott Road (Figure V-24) – Another alternative analyzed in this study involves preventing right turns from Swampscott Road onto Highland Avenue, creating a rerouted movement from Swampscott Road to First Street to Traders Way. It should be noted that many vehicles are currently using this route to bypass the large queues on Highland Avenue. The level of service improves at the Marlborough Road/Traders Way intersection from an F to an E, at the Swampscott Road/Dipietro Avenue from a D to a C, and at Swampscott Road and First Street from an F to a C as depicted in Figure V-25. The advantage of this concept is that the left turn queue from Highland Avenue onto Marlborough Road is shortened and the northbound vehicular traffic is reduced. The left turn queue from Highland Avenue onto Swampscott Road is not shortened. At a Working Group meeting, there was concern about the significant queueing on Traders Way on Saturdays. If this alternative is to move forward, the study team should consider adding an additional lane on Traders Way. This alternative was placed into continued consideration and ultimately discarded due to the limited benefit on Highland Avenue.

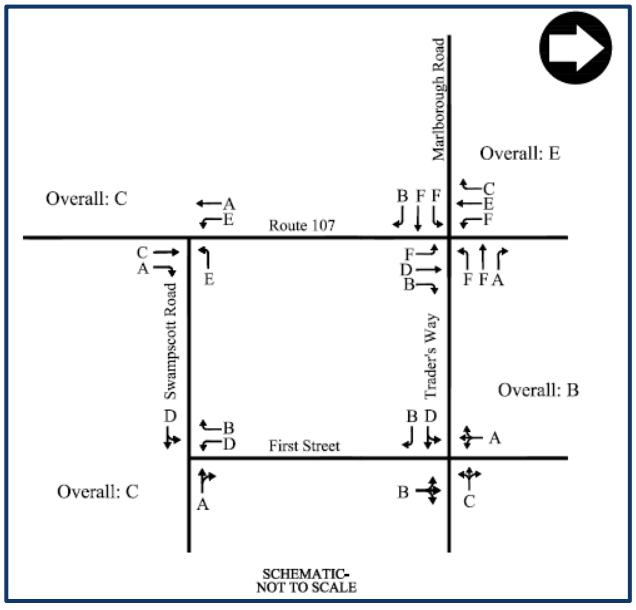


Figure V-25: Level of Service

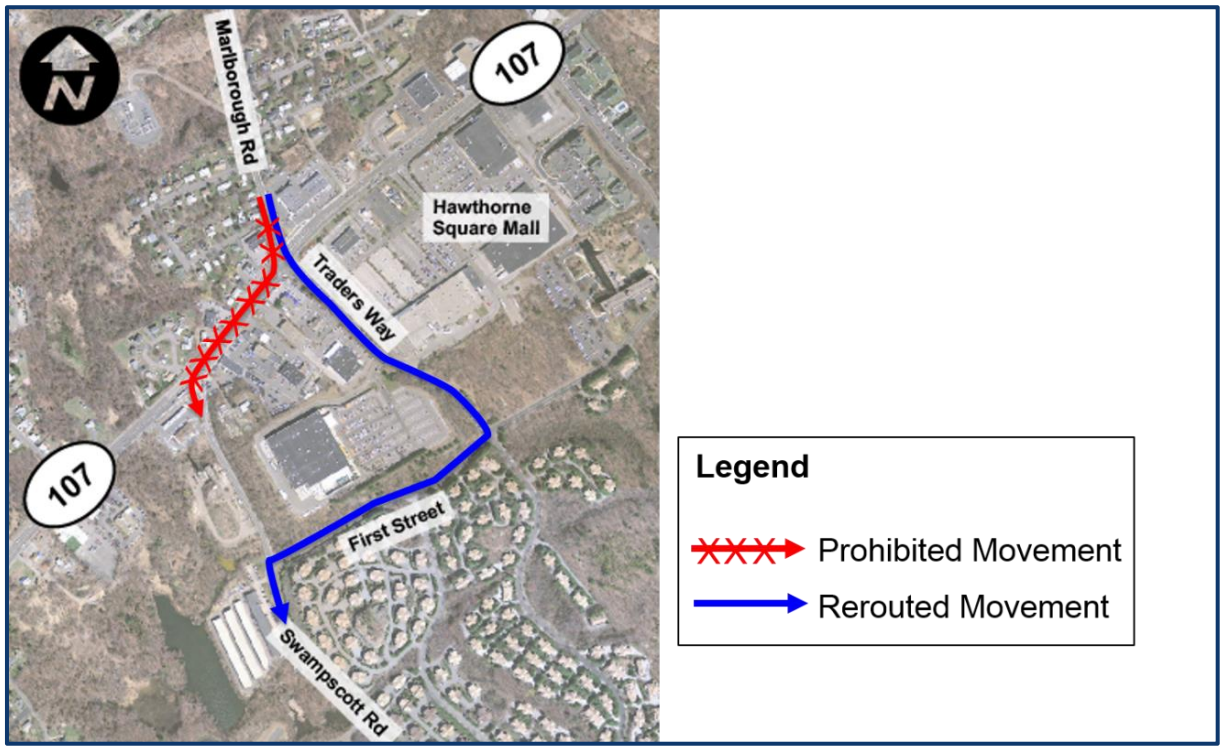


Figure V-26: Limited Marlborough Road to Swampscott Road Connection

Limited Marlborough Road to Swampscott Road Connection (Figure V-26) – This option combines two previous options by restricting the movement from Marlborough Road to Swampscott Road. The restriction may be done through a physical barrier or lane markings. The redirected movements consist of a thru movement at Marlborough Road/Traders Way, a right movement at First Street, and a left movement onto Swampscott Road. As shown in Figure V-27, this option improved the level of service for the Swampscott Road/Dipietro Avenue intersection from a D to a C and the First Street at Swampscott Road intersection from an F to an E in the PM peak hour. There is no change in level of service for the other two intersections. This alternative shortens the left turn queue onto Swampscott Road; however, it does not shorten the left turn queue onto Marlborough Road. This option was placed into further consideration. After further consideration, the limited improvements to the left turn queue on Highland Avenue at Marlborough Road prevented this option from becoming the preferred option.

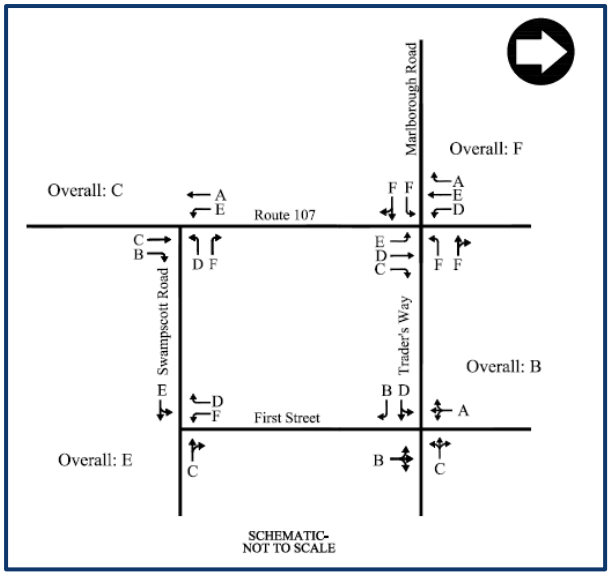


Figure V-27: Level of Service

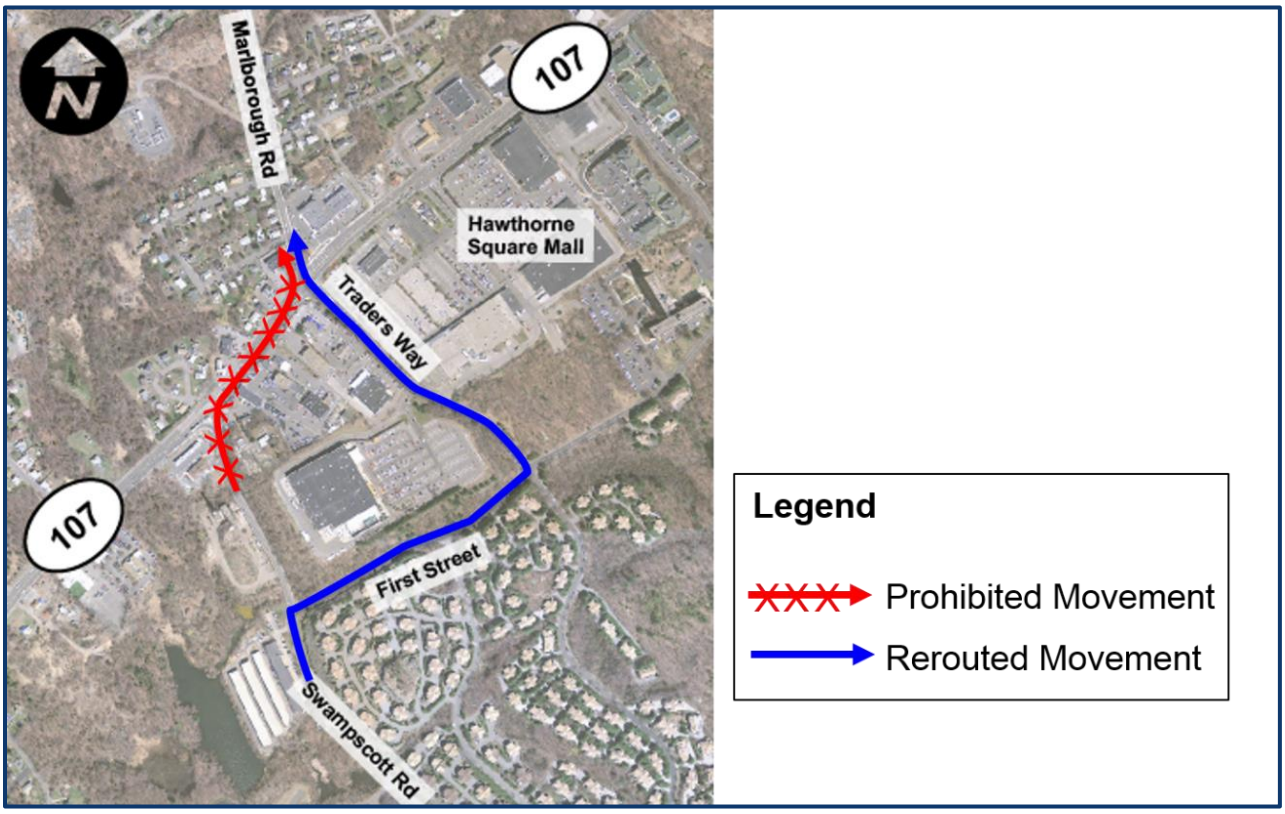


Figure V-28: Limited Swampscott Road to Marlborough Road Connection

Limited Swampscott Road to Marlborough Road Connection (Figure V-28) – Once again, two previous scenarios are combined to create this alternative which involves the restriction of the movement from Swampscott Road to Marlborough Road. Physical barriers or lane markings would be used to create this restriction. The rerouted movement consists of a right turn from Swampscott Road onto First Street, left turn onto Traders Way, and finally a thru movement at Marlborough Road. This alternative improves the level of service for the Marlborough Road/Traders Way intersection from an F to a D, the Swampscott Road/Dipietro Road from a D to a C, and Swampscott Road/First Street from an F to a C in the afternoon peak hour (See Figure V-29). This alternative shortens the left turn queue onto Marlborough Road. This option shortens the left turn queue onto Marlborough Road and does not change the left turn queue onto Swampscott Road. This alternative was not recommended as it resulted in limited improvement to queues and traffic operations on Highland Avenue.

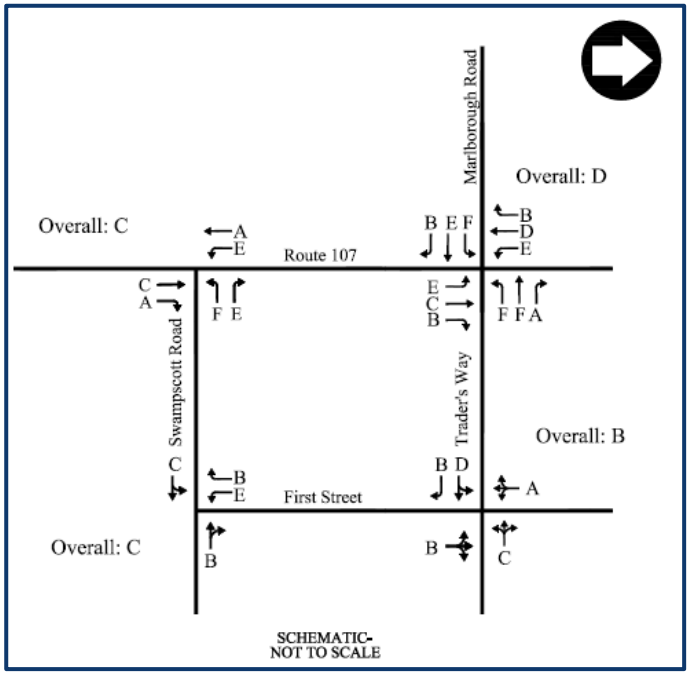


Figure V-29: Level of Service

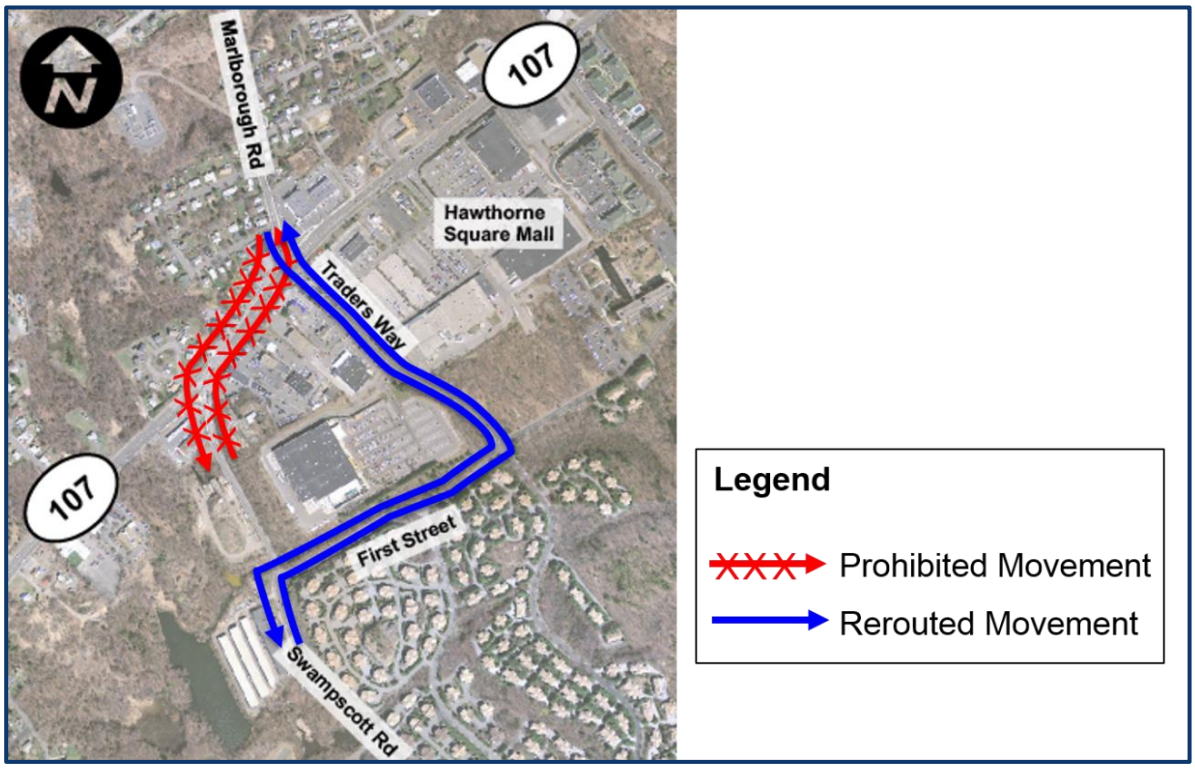


Figure V-30: No Connection Between Marlborough Road and Swampscott Road via Route 107

No Connection Between Marlborough Road and Swampscott Road via Route 107 (Figure V-30) – The combination of the two previous alternatives resulted in the reduction of queues at both the Marlborough Road and Swampscott Road intersections. Figure V-31 depicts that the level of service for this option improves from an F to an E at the Marlborough Road/Traders Way intersection, a D to a B at the Swampscott Road/Dipietro Road intersection, a B to an A at the Traders Way and First Street intersection, and an F to an E at the Swampscott Road and First Street intersection. This option was selected for continued consideration.

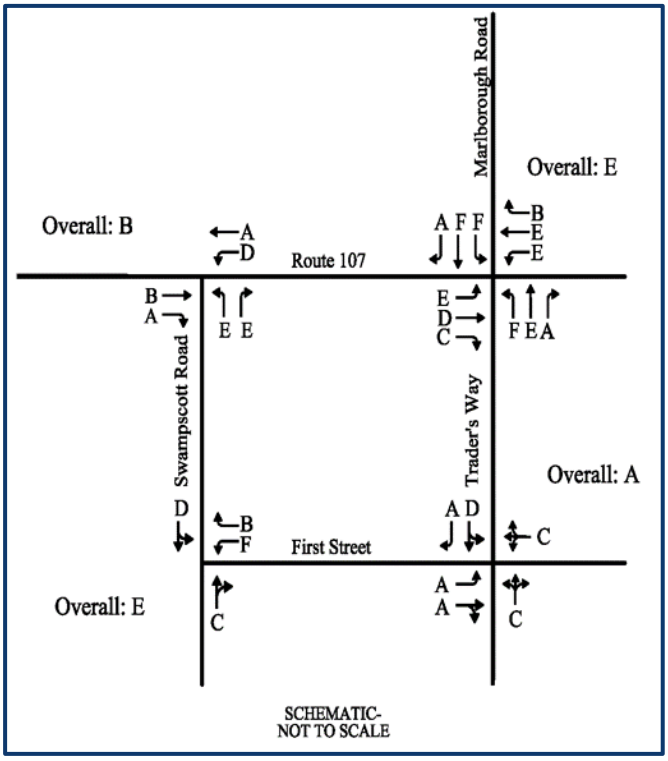


Figure V-31: Level of Service

Roundabout Alternatives (Figure V-32) – The feasibility of a roundabout was considered at both intersections of Swampscott Road/Dipietro Road and Marlborough Road/Traders Way. The benefits of roundabouts include shorter pedestrian crossings, traffic calming by slowing vehicles down, and delay distribution. There are significant safety benefits due to the slowing of traffic at roundabouts.

Swampscott Road/Dipietro Road Roundabout (Figure V-33) – This study reviewed traffic volumes and determined that if a roundabout were to be implemented at this intersection it would require two travel lanes. Roundabouts function best when roads enter at 90 degree angles; however, the current roadway alignment, specifically the alignment of Dipietro Road, prevents the 90 degree angle. In addition, the roadside constraints of ledge and large walls limits the feasibility of a roundabout at this intersection. Additional drawbacks include impacts to multiple adjacent properties and grading issues. As a result a roundabout at Swampscott Road/Dipietro Road is not recommended.

Marlborough Road/Traders Way Roundabout (Figure V-34) – Based on traffic volumes, a two-lane roundabout would be required at this intersection. The analysis considered additional right turn bypass lanes from Highland Avenue northbound onto Traders Way and Highland Avenue southbound onto Marlborough Road. This design would accommodate large heavy vehicles. While the roundabout concept has positive effects, the conversion of this intersection into a roundabout would have major impacts to adjacent properties. The property impacts imposed by the roundabout are not simply strip taking of adjacent lane but instead would require

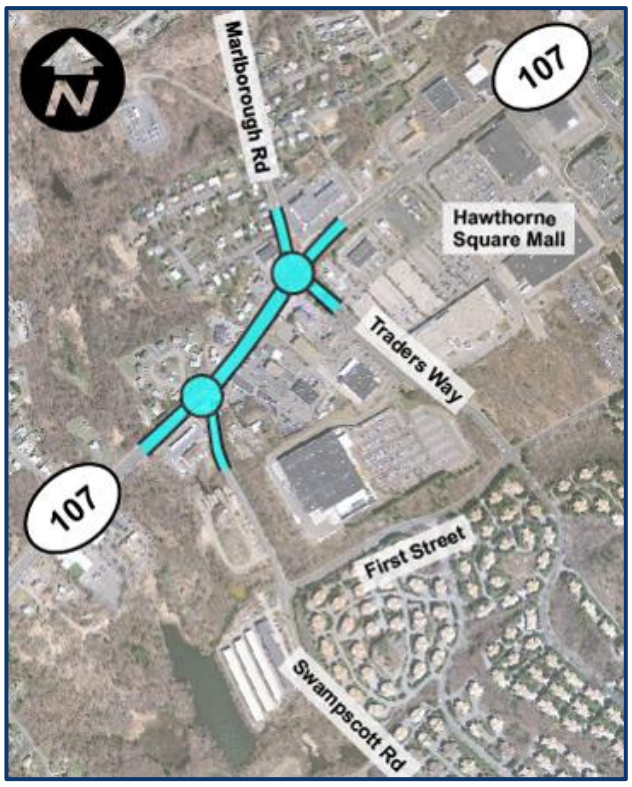


Figure V-32: Roundabout Alternatives

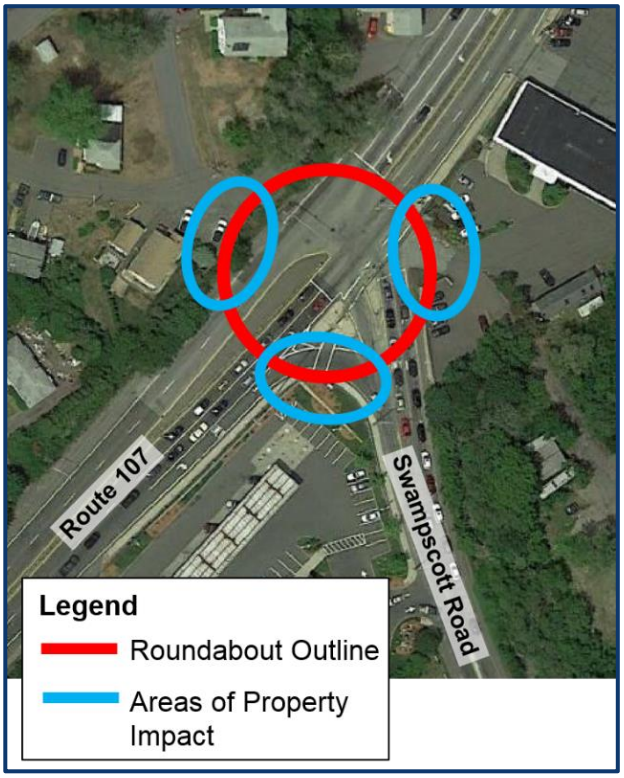


Figure V-33: Swampscott Road/Dipietro Road Roundabout

takings of entire parcels and relocations of the businesses or residences on the parcel. Initially, a roundabout at Marlborough Road/Traders Way was placed into continued consideration. This option was ultimately rejected due to the limited benefits on Highland Avenue versus the anticipated cost of the construction of the roundabout and the property impacts to construct the roundabout.

Marlborough Road Roundabout and No Left Turn onto Swampscott Road (Figure V-35) – By combining the Marlborough Road Roundabout with the No Left Turn onto Swampscott Road option, the rerouted movement from Marlborough Road or Highland Avenue to Swampscott Road consists of motorists traveling onto Traders Way, turning right onto First Street, and then a left turn onto Swampscott Road. The roundabout provides additional left turns. The left turn queue onto Swampscott Road is shortened through this option. This alternative was ultimately discarded due to the substantial right of way requirements for the roundabout, as discussed previously.

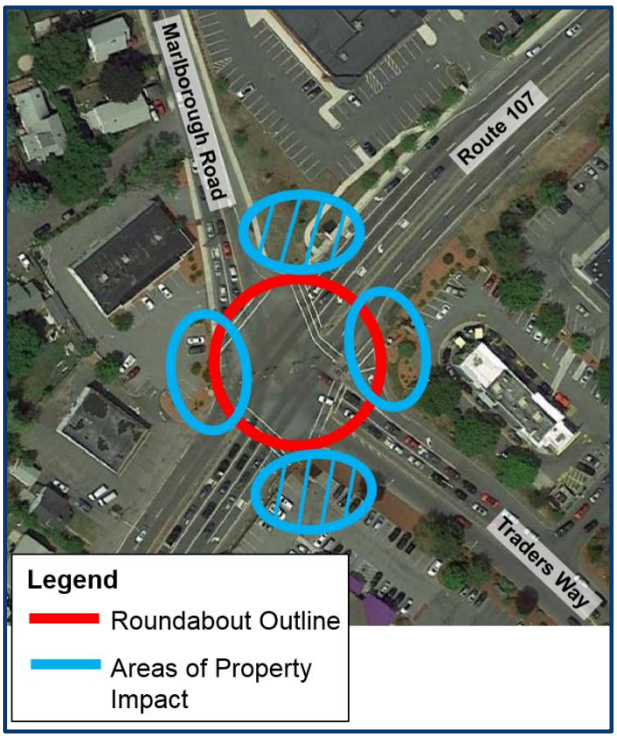


Figure V-34: Marlborough Road/Traders Way Roundabout

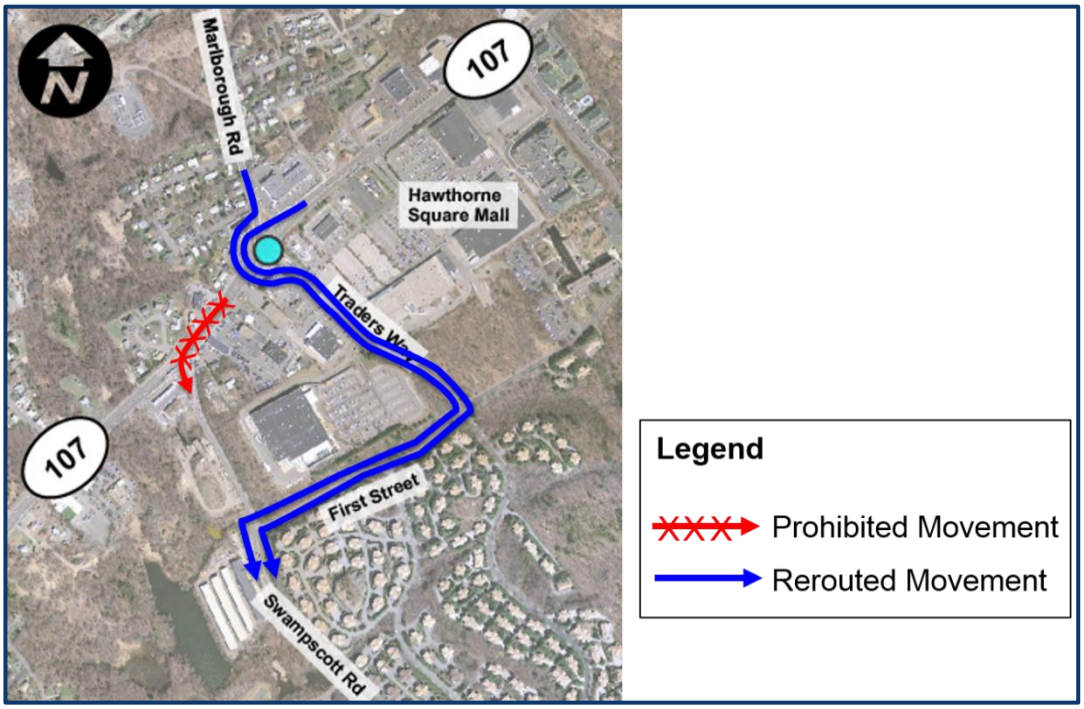


Figure V-35: Marlborough Road Roundabout and No Left Turn onto Swampscott Road

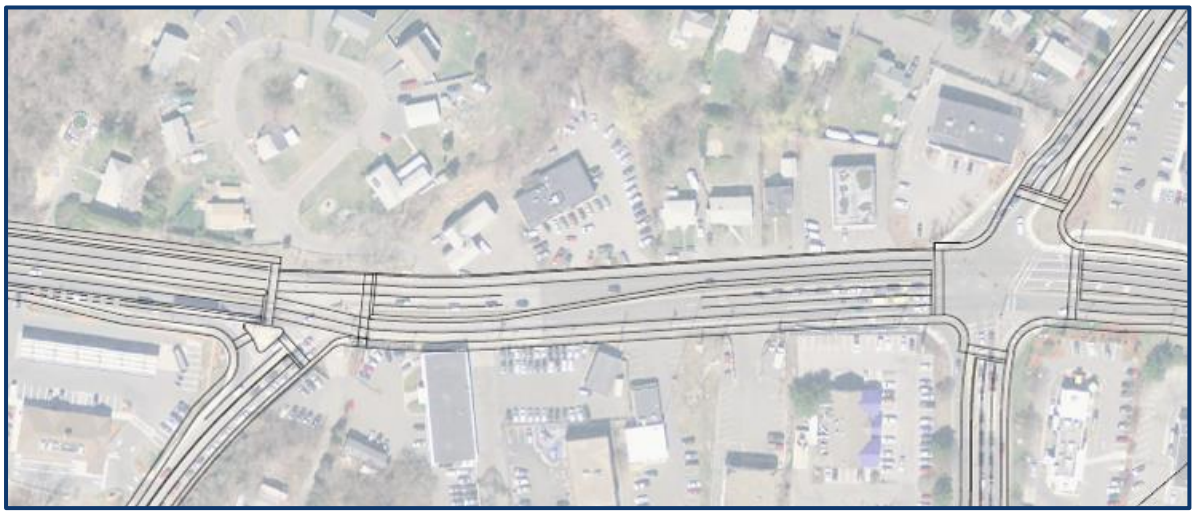


Figure V-36: Dual Left Turn at Swampscott Road and Marlborough Road

Dual Left Turn at Swampscott Road and Marlborough Road (Figure V-36) – This concept does not restrict any movements and keeps the traffic on Route 107. This option adds a left turn at both intersections to accommodate the zig zag movement, providing double left turn lanes onto Swampscott Road. Due to limited right-of-way, this option impacts most of the properties along Route 107 and requires at least three takings of commercial or residential buildings as shown in Figure V-37. This option does not include bicycle lanes or the addition of a sidewalk on the west

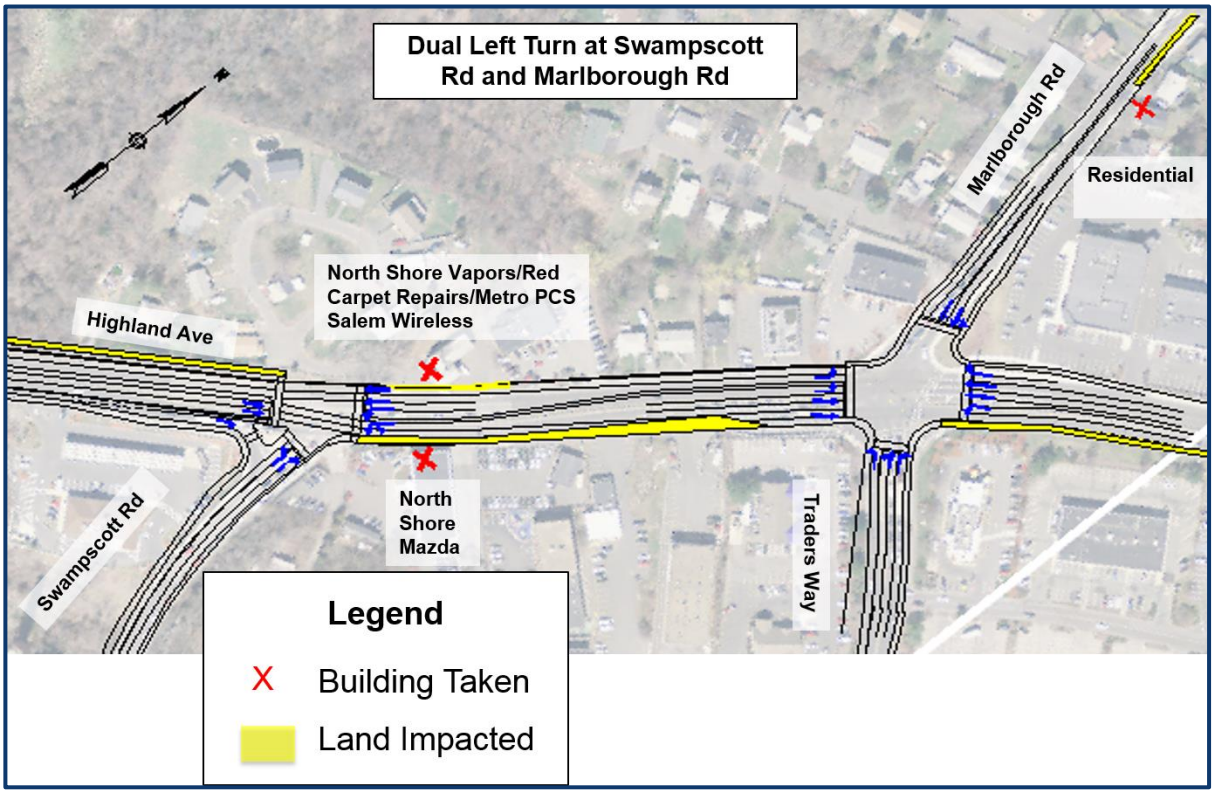


Figure V-37: Property Impacts

side of Route 107 to limit property impacts. The LOS table depicted in Figure V-38 demonstrates that this option does not improve the overall operation of both intersections during the PM peak hour. This alternative is not recommended since the limited benefits do not outweigh the property impacts.

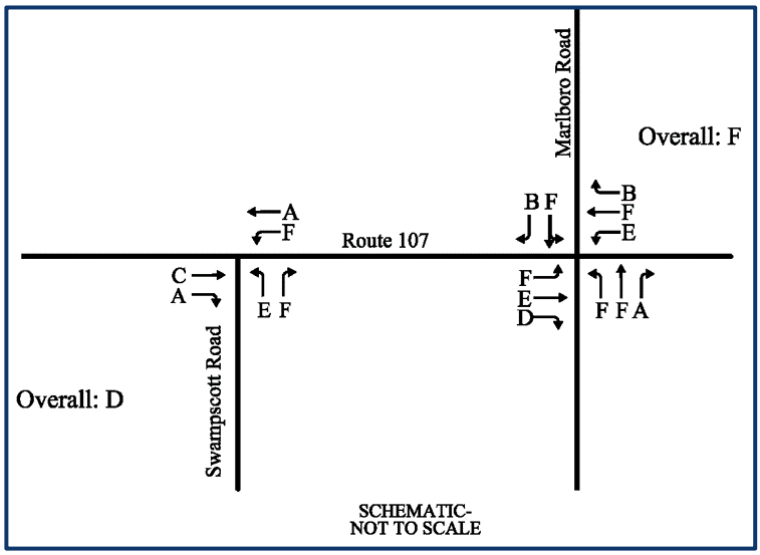


Figure V-38: Level of Service

Marlborough Road Roundabout and Dual Left Turn Lanes at Swampscott Road (Figure V-39) – Once again, this alternative does not prohibit any movements and keeps the traffic on Highland Avenue. This concept adds a left turn lane at the Swampscott Road intersection and converts the Marlborough Road intersection to a roundabout. Bicycle lanes and a sidewalk on the west side of Route 107 are shown in this option. Figure V-40 demonstrates the property impacts along Route 107 as at least five buildings or residences will be taken. The overall operation of both intersections for the PM peak hour does not improve as shown in the LOS table (Figure V-41). This scenario is not recommended since the limited benefits do not outweigh the property impacts.

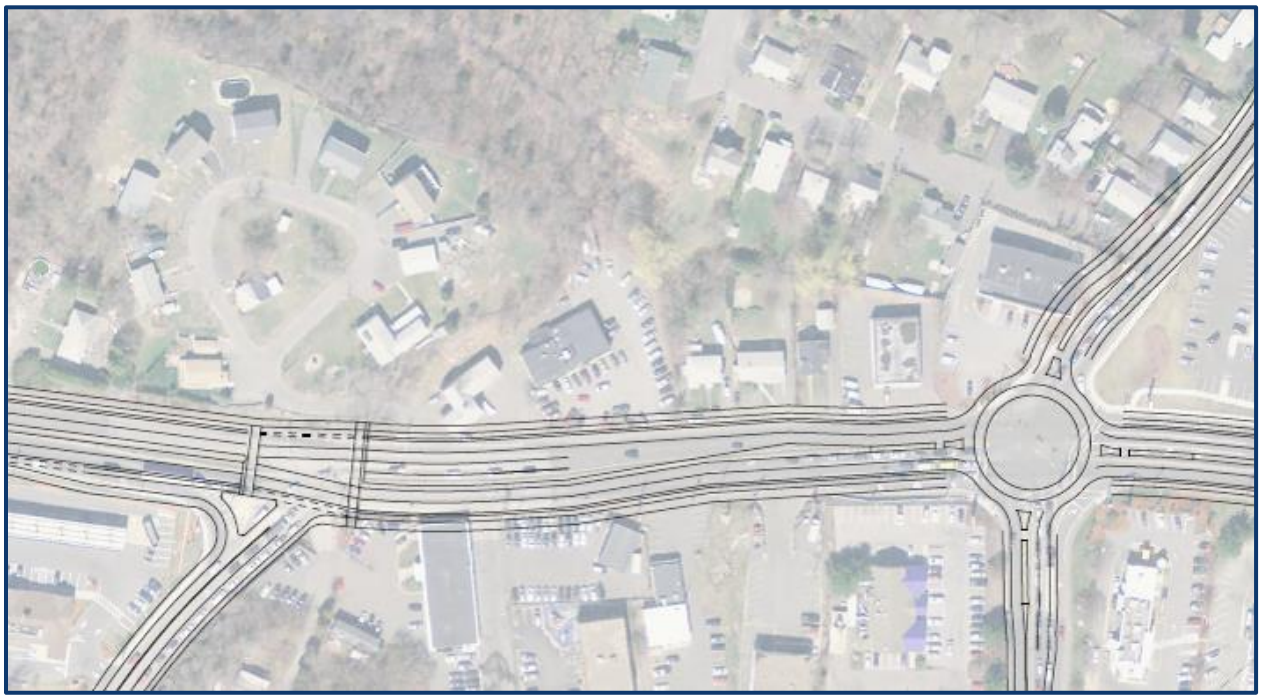


Figure V-39: Marlborough Road Roundabout and Dual Left Turn Lanes at Swampscott Road

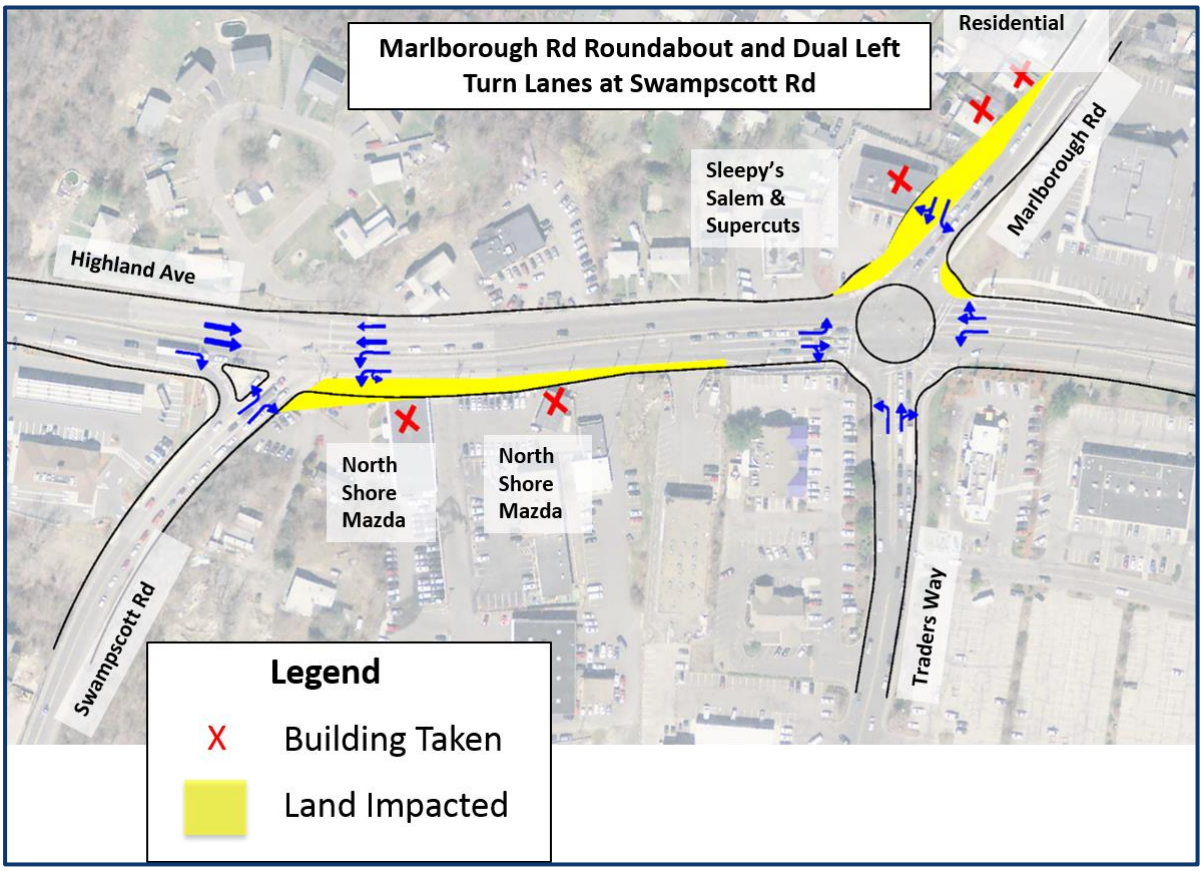


Figure V-40: Property Impacts

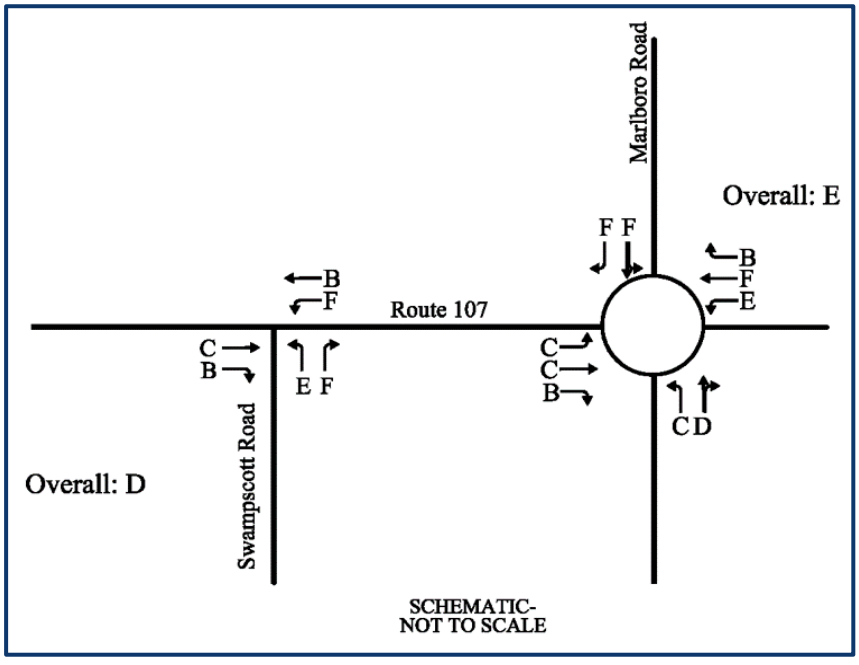


Figure V-41: Level of Service

Figure V-42: Marlborough Road Roundabout Shifted Toward CVS with Northbound and Southbound Bypass Lanes and Dual Left Turn Lanes at Swampscott Road

Marlborough Road Roundabout Shifted toward CVS with Northbound and Southbound Bypass Lanes and Dual Left Turn Lanes at Swampscott Road (Figure V-42) – This option modifies the previous one by shifting the location of the roundabout north to provide ample space for bypass lanes. Bicycle lanes and a sidewalk are depicted in this scenario. The property impacts are significant with at least four commercial buildings being taken along with land adjacent to Route 107 being impacted as shown in Figure V-43. The vehicular operation for both intersections in the PM peak hour remains the same as shown in the LOS table (Figure V-44). This alternative is not recommended since the limited benefits do not outweigh the property impacts.

Swampscott Road at Highland Road Relocation (Figure V-45) – The last alternative for the zig zag segment considered relocating the Swampscott Road at Highland Road intersection approximately 400 feet south. This concept increases the distance between the signalized intersections of Route 107 at Swampscott Road and Route 107 at Marlborough Road and provides increased storage length for the Route 107 left turn lanes. Currently the Route 107 left turn lanes overflow and block through traffic during peak periods. The increased storage for left turns will improve this situation. However, as shown in the figure, this option takes three businesses and impacts the Forest River, an environmental resource area. Due to the significant environmental and property impacts, no further analysis was performed for this scenario and it is not recommended.

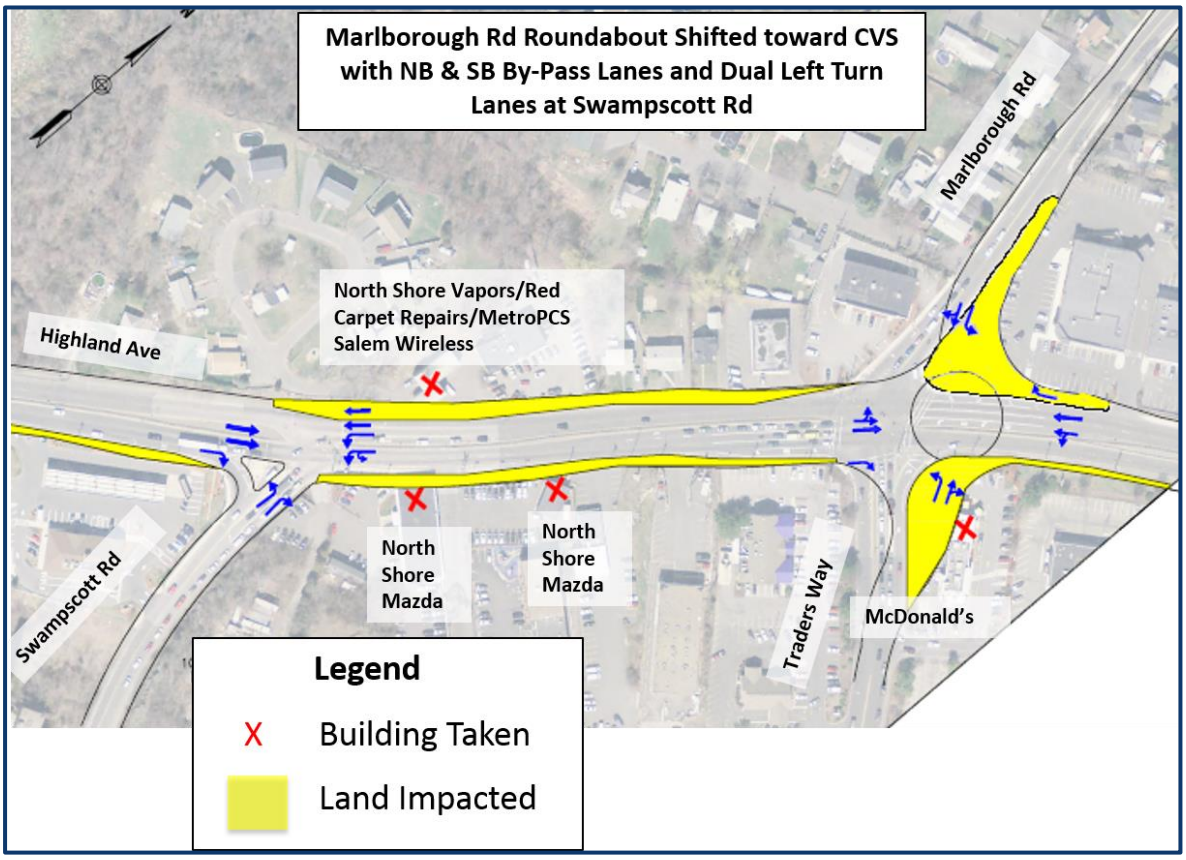


Figure V-43: Property Impacts

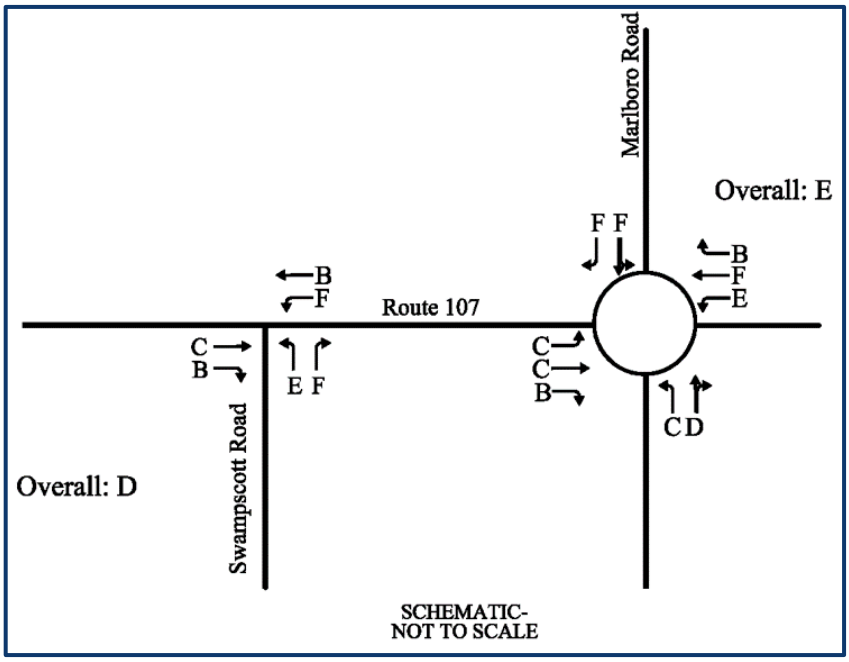


Figure V-44: Level of Service

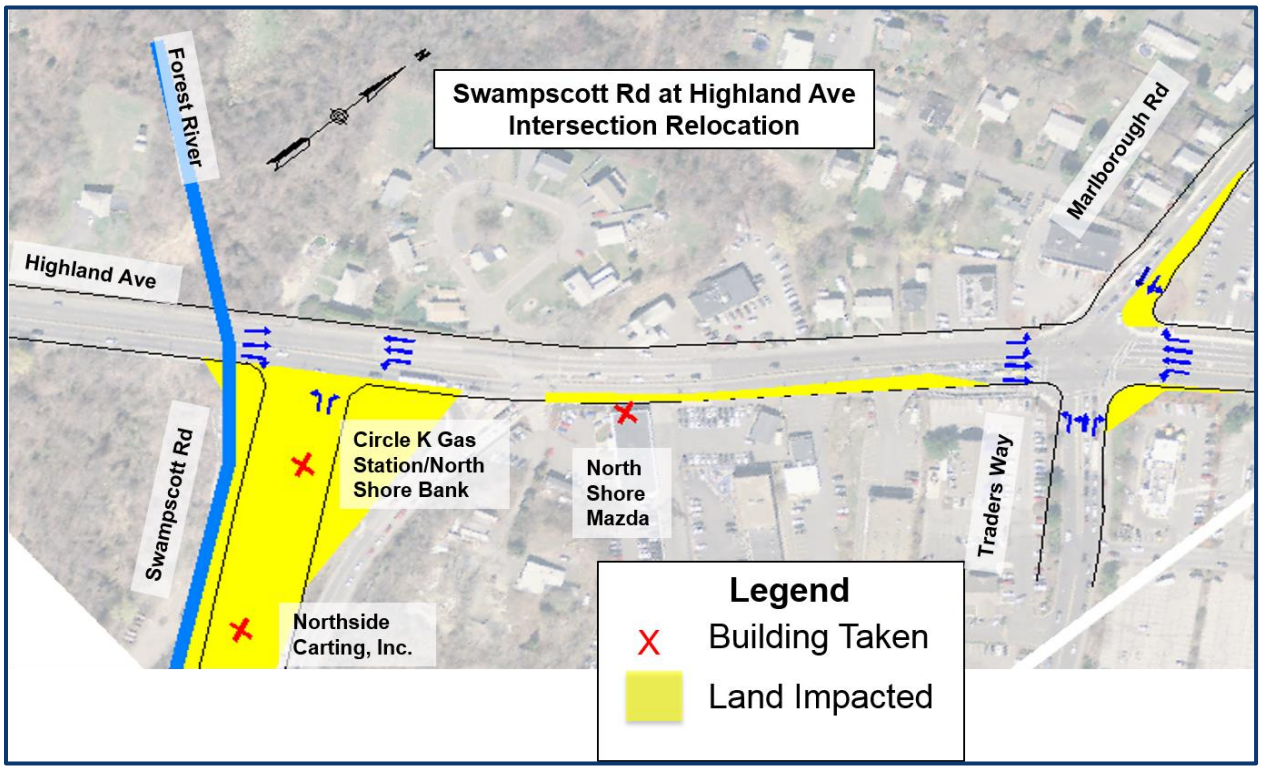


Figure V-45: Swampscott Road at Highland Road Relocation

In reviewing the various options considered for the zig zag area, a number of options resulted in significant right of way impacts and therefore, were not considered feasible. There were also a number of options that addressed only one direction of the zig zag movement. Alternatives that addressed the zig zag movement in both directions and did not have significant consequential right of way impacts offered the most potential for future consideration. Therefore, the alternatives that remove connections between Marlborough Road and Swampscott Road via Route 107 remain under consideration. This option provides increased capacity and reduced congestion at both intersections on Route 107 while minimizing impacts to adjacent properties. In addition, there is adequate space for bicycle lanes and a sidewalk on the west side of Route 107.

As this option is studied further, there are several additional elements that should be evaluated:

1. Re-alignment of the First Street and Swampscott Road intersection to establish the Swampscott Road northbound and First Street as the through movement as shown in Figure V-46. This recommendation improves the level of service of the intersection from an F to a C as depicted in Figure V-47.
2. Adding another westbound lane on Traders Way at the Marlborough Road/Traders Way intersection.
3. Adding a free-right turn lane with a larger radius from Traders Way onto First Street.
4. Additional traffic analysis is suggested to estimate and evaluate the amount of traffic shifted from Route 107 onto Traders Way and First Street.

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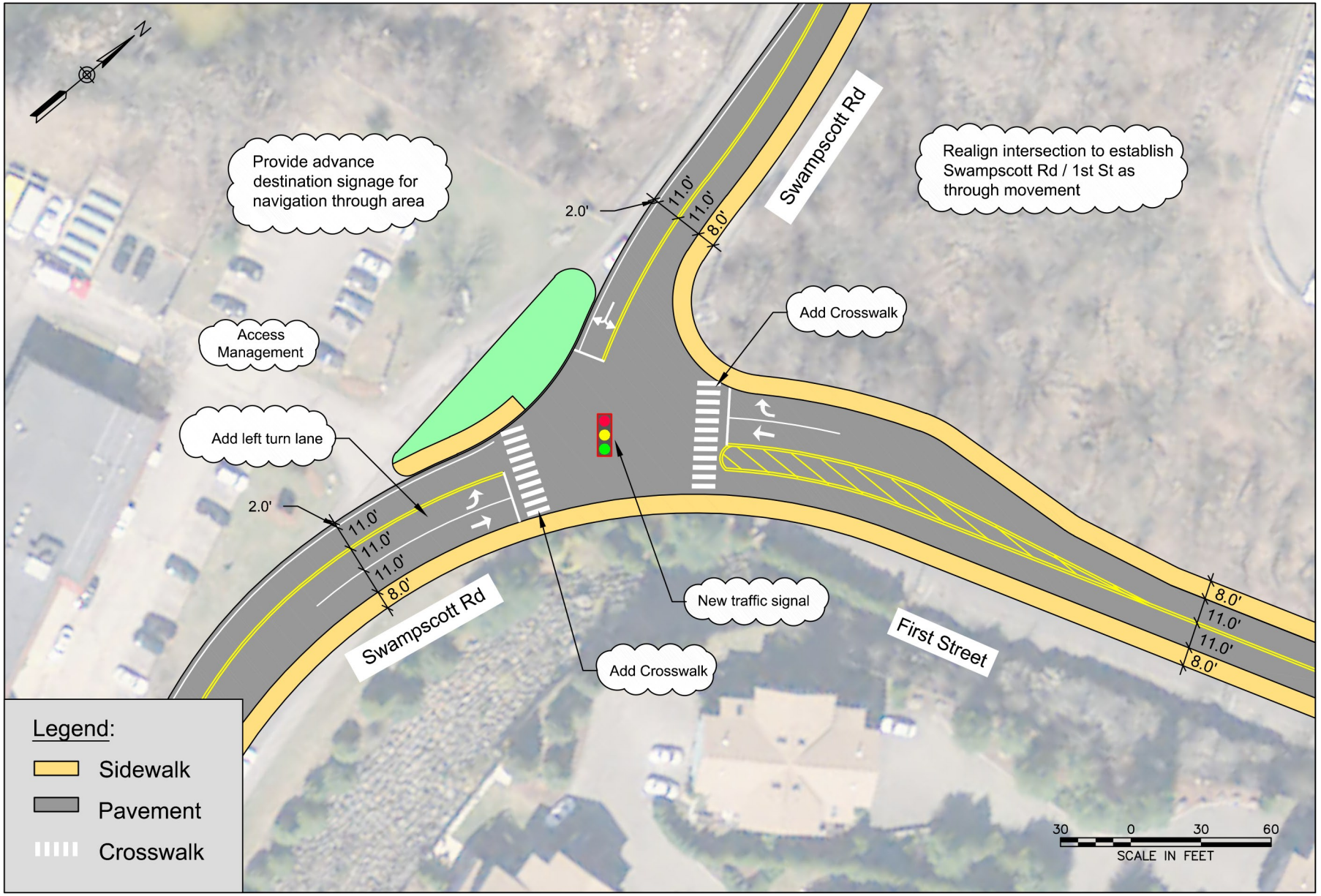


ROUTE 107 Lynn Salem Corridor Study

Figure V.46
Swampscott Road at First Street
Route 107 Corridor Study
Lynn/Salem, MA

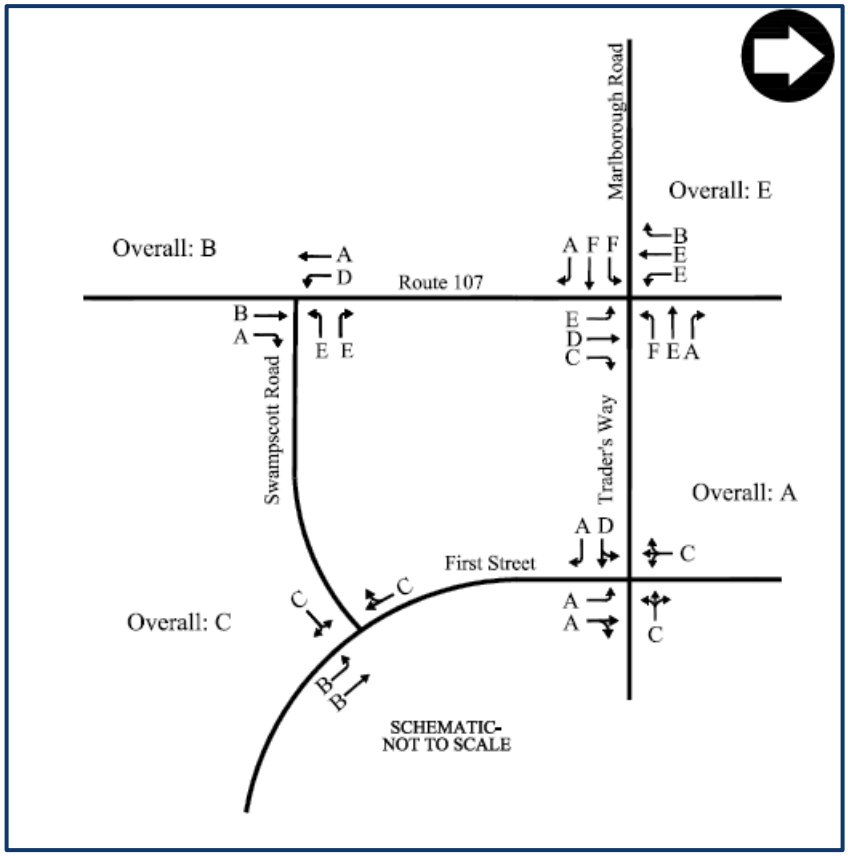


Figure V-47: Level of Service

4. NORTHERN STUDY AREA ALTERNATIVES

The existing vehicular configuration of Route 107 within the northern study area segment varies from its four lane configuration near the schools to the wide single lanes provided near Salem Hospital. The right-of-way in the northern study area is 60 feet wide and the existing roadway cross-section provides two travel lanes, with four-foot grass strips and five-foot sidewalks on both sides.

In order to accommodate a proposed bicycle facility through the northern study area segment of Route 107 two-way separated bicycle lanes, protected buffered bicycle lanes and a shared use path were explored. Due to the constrained right-of-way through this segment of the study area, the implementation of bicycle facilities is often proposed with the minimum widths required to meet current standards. All of the alternatives discussed below are able to reduce the level of traffic stress currently experienced by bicyclists within the study area.

The majority of the northern study area segment provides narrow sidewalks on both sides of the roadway. Therefore, the primary focus of the pedestrian improvements within the area would be to provide additional sidewalk width where available or provide a shared use path through the entirety of the section to maximize the available pedestrian space. In addition to proposed sidewalks, the following would also be included in the potential pedestrian improvements:

- Maintaining an ADA compliant path for the entirety of the segment
- Providing accessible curb ramps at intersections and crossings
- Providing crosswalks at all signalized intersections for all approaches
- Improving unsignalized crossings
- Reevaluating signal timings to accommodate up-to-date pedestrian phase timings.

There are a number of opportunities to improve vehicular traffic operations and safety. Roadway modifications such as exclusive turn lanes, improved intersection geometry and a review of existing and potential traffic signals would be expected to enhance safety and operations within this segment of the Route 107 study area.

Exclusive turn lanes at certain study area intersections would remove vehicles waiting to turn left from the through movement on Route 107. The addition of the turn lanes would be expected to reduce the number of sideswipe collisions from vehicles attempting to pass on the narrow roadway and improve visibility of turning vehicles potentially reducing the number of angle collisions. Figure V-48 depicts

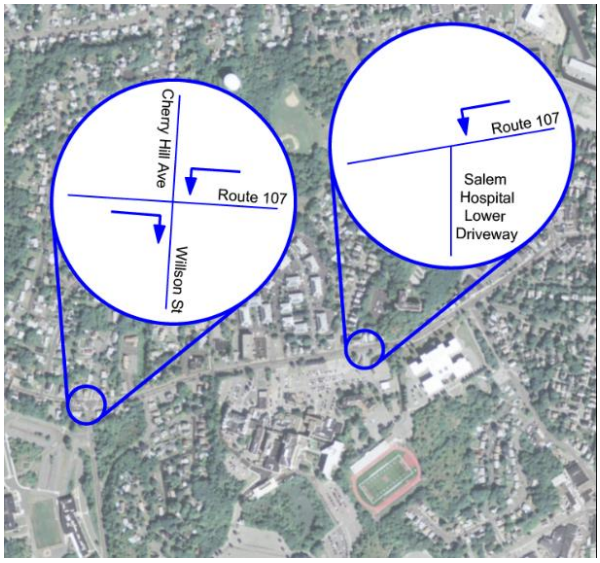


Figure V-48: Potential Implementation of Exclusive Left-turn Lanes (Northern Study Area)

the locations within the northern study area segment which were reviewed for the potential implementation of exclusive left-turn lanes.

A traffic signal warrant analysis at the Salem Hospital lower driveway indicated that a signal is warranted.

Potential Roadway Cross-sections – Northern Segment

The first cross-section explored included one travel lane in each direction, a sidewalk with planting area on one side of the roadway and a separated shared use path on the other side of the roadway, as depicted in Figure V-49.

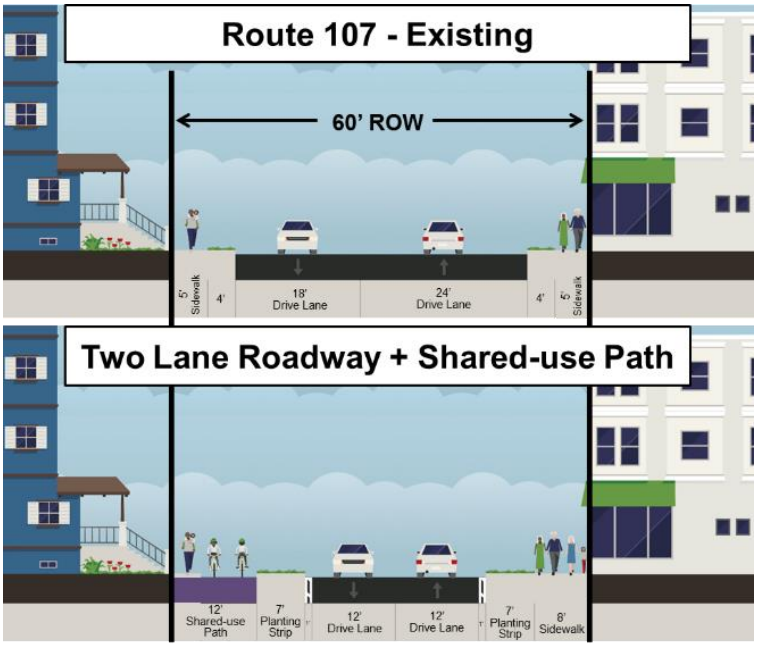


Figure V-49: Two Lane Roadway + Shared-use Path

Opportunities

- Reduction of travel lane width
- Landscaping separation between vehicles and pedestrians and bicyclists
- Landscaping to act as traffic calming for vehicle speeds.
- Improved definition of travel way with lane markings (and anything else)

Issues:

- Potential conflicts between cyclists and pedestrians
- No separation for left-turns at unsignalized intersections with Route 107
- Bicyclists directed to one side of the road

The next cross-section explored as part of the study included the implementation of a two-way separated bicycle lane, as depicted in Figure V-50.

Opportunities:

- Separation of all modes
- Wider sidewalks
- Reduction of travel lane width
- Improved definition of travel way with lane markings

Issues:

- Difficult to add turn lanes at intersections
- Bicyclists directed to one side of the road

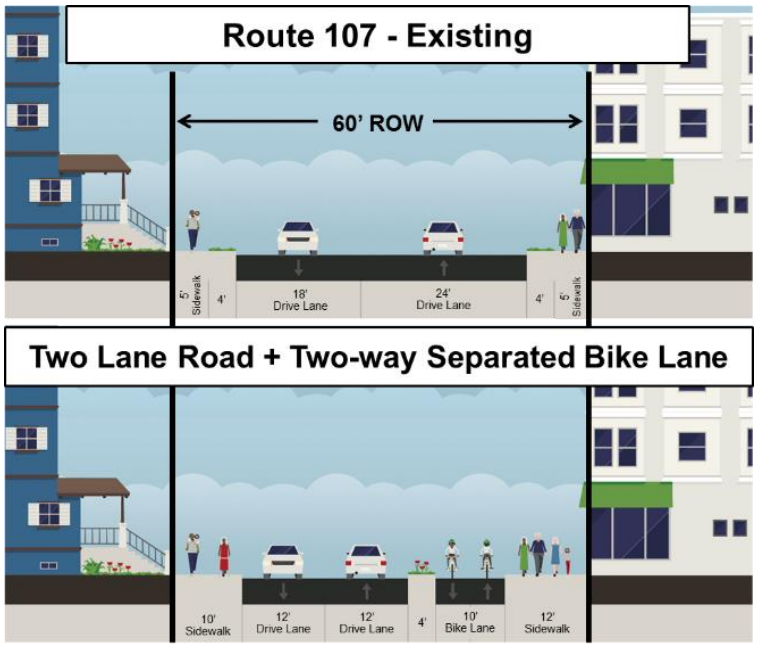


Figure V-50: Two Lane Road + Two-way Separated Bike Lane

The next cross-section considered included one 11-foot travel lane in each direction and a 12-foot center two-way left-turn lane (TWLTL), as depicted in Figure V-51. It also includes five-foot bicycle lanes in each direction which are separated from the travel lane by one-foot buffers, along with seven-foot sidewalks on each side of the road.

Opportunities

- Reduce congestion and friction caused by left turning vehicles
- Reduction of travel lane width
- Improved definition of travel way with lane markings (and anything else)
- Separation of all modes
- Sidewalks on both sides of the roadway

Issues:

- Narrow bicycle facilities
- Minimal protected buffer between vehicles and bicycles

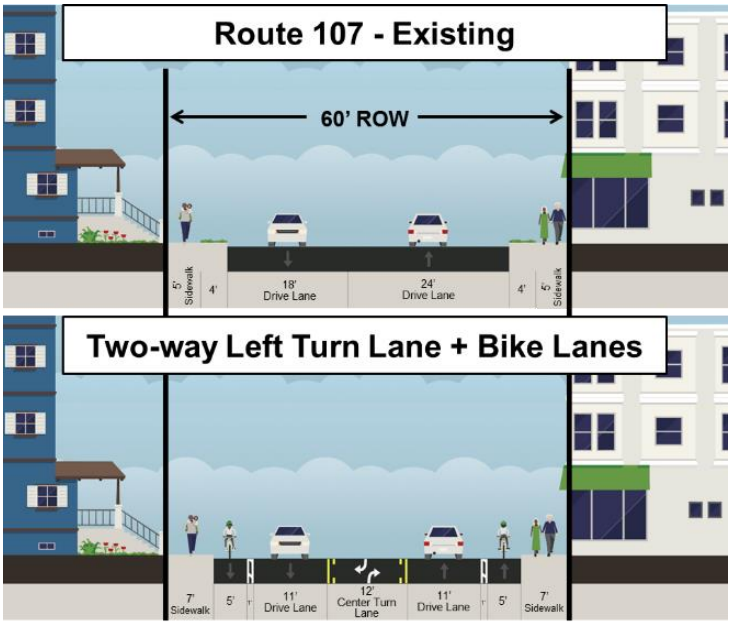


Figure V-51: Two-way Left Turn Lane + Bike Lanes

During discussions on the northern segment, the Working Group expressed concern about access at the fire station.

VI. RECOMMENDATIONS

A. INTRODUCTION

Improvements within the Route 107 study area were developed in accordance with the MassDOT Project Development and Design Guide of 2006.

In selecting the recommended cross-sections and intersection improvements, the primary considerations consisted of how the alternative met the study goals and objectives and input from the Working Group. The study goals and objectives are defined previously in Chapter 1. In addition, the following items were considered:

- Selecting proposed improvements that were practical and feasible
- Selecting alternatives that minimized right of way impacts and fit with the surrounding land use and vision of the communities
- Selecting alternatives which required fewer long-term maintenance obligations

B. LONG-TERM RECOMMENDED ALTERNATIVE

The recommended long-term improvements for the Route 107 study area are described in this chapter of the report. The recommendations are organized initially by study area-wide improvements by transportation mode. Next the improvements that apply to each of the three roadway segments; the Lynn study area, the retail study area and the northern study area, are described. This is followed by details of the intersection improvements. The cost estimates for the collective long-term recommendations are provided. Lastly, an evaluation matrix is presented for the long-term improvements, along with information on the next steps for the study in terms of MassDOT's project development and design process.

The recommendations support the following state and federal policies and regulations:

- The Massachusetts Healthy Transportation Policy, with focus on balancing the needs of all users, expanding mobility, improving public health, and supporting a clean environment.

- The Massachusetts Global Warming Solutions Act of 2008, which seeks a 25% reduction in greenhouse gas emissions from 1990 levels in 2020 across the state. This policy is served by MassDOT's mode shift goal of tripling the share of walking, bicycling, and transit usage.

1. STUDY AREA IMPROVEMENTS

Bicycle

Image VI.1: Bicycle Lane

Image VI.2: Protected Buffered Bicycle Lane

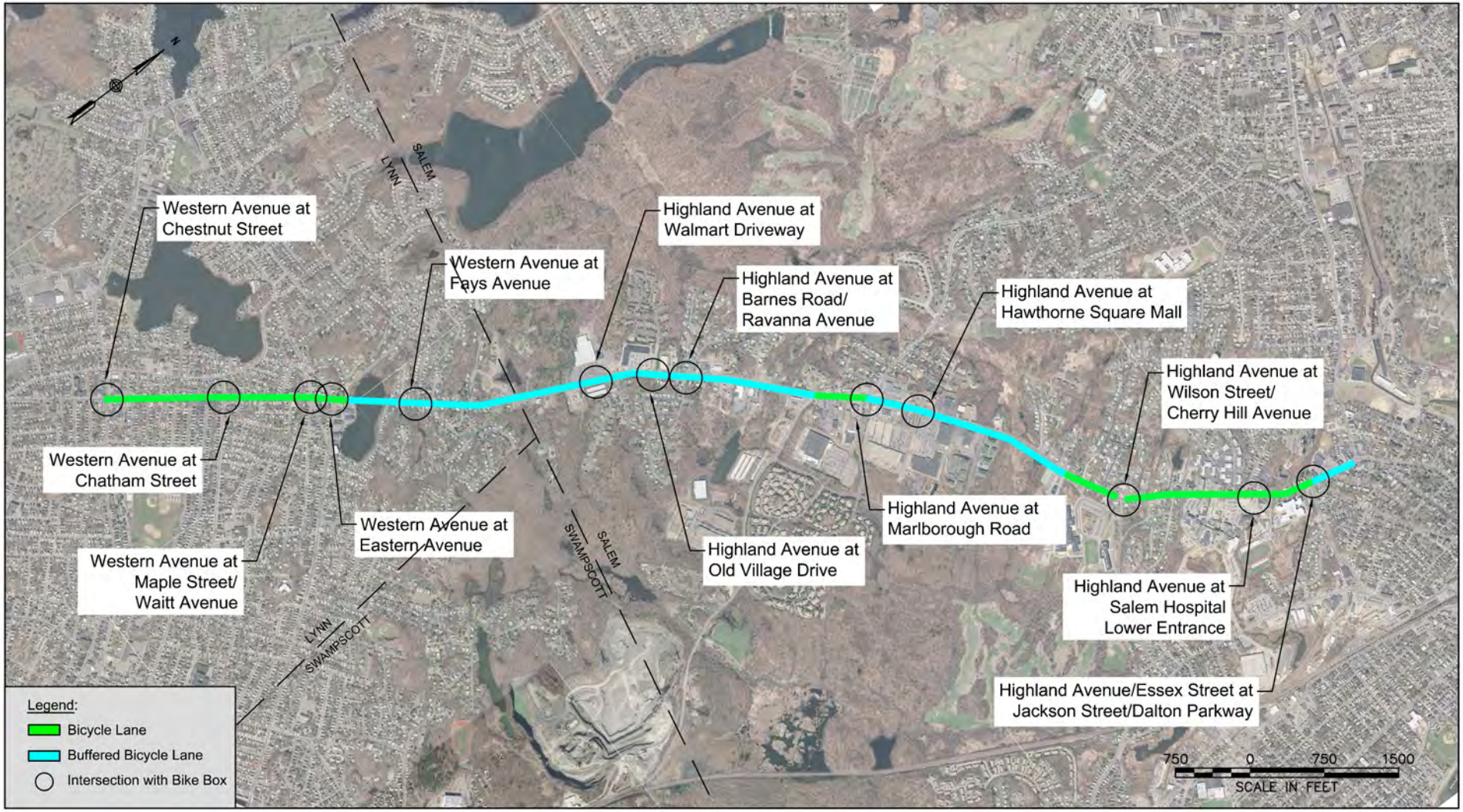
Bicycle lanes are recommended in both the northbound and southbound direction for the length of the study area. The recommended bicycle improvements are shown in Figure VI-1. Starting from the southern end of the study area, bicycle lanes, such as those shown in Image VI.1, are recommended to run from Chestnut Street to Linton Road in Lynn. North of Linton Road a protected buffered bicycle lane is proposed. Protected buffered bicycle lanes, depicted in Image VI.2, provide enhanced protection for cyclists from vehicular traffic as the retail portion of the study area becomes a faster, multi-lane thoroughfare. The protected buffered bicycle lane remains on both sides of the study area until Swampscott Road in Salem. From Swampscott Road to Marlborough Road, also known as the "zig zag", there would be unprotected bicycle lanes due to roadside constraints. After Marlborough Road, for the remainder of the retail study area, the protected buffered bicycle lane picks back up until just short of Freeman Road in Salem, where it transitions back to an unprotected bicycle lane.

Only one short section exists (approximately 200 feet) in the southbound direction only where the bicycle lane does not fit, and sharrows are necessary. This is located just south of the Willson Street intersection where an additional receiving lane is necessary for adequate operation of the intersection, and the right of way is extremely constrained.

The bicycle lanes become buffered again just north of Dalton Parkway. The protected buffered bicycle lanes continue until the end of the study area at Boston Street and Essex Street where it joins the "shared street" (described further in Pedestrian section below).

Bicycle boxes are also proposed throughout the study area. Bicycle boxes, pictured in Image VI.3, help cyclists get out ahead of traffic during the red signal phase to navigate safely through an intersection. Both the location of bicycle boxes, bicycle lanes, and protected buffered bicycle lanes are depicted in the Conceptual Study Area Improvements, described in the subsequent sections of this report.

Image VI.3: Bicycle Box from Portland, OR



ROUTE 107 Lynn Salem Corridor Study

Figure VI-1
Proposed Bicycle Features
Route 107 Corridor Study
Lynn/Salem, MA

Pedestrian

Pedestrian improvements along the study area include the addition of sidewalks, crosswalks, curb extensions, and a shared street. Starting at the southern end of the study area in Lynn, a curb extension is proposed at (the southern end of the Buchanan Bridge before) Eastern Avenue. A curb extension is pictured in Image VI.4, and provides a safer, shorter crossing for pedestrians. It also increases the space available for benches, plantings, and street trees. A planted island in the center of the crossing across Eastern Avenue is also recommended. This creates a safer pedestrian crossing with a space for pedestrians to wait and also provides a traffic calming measure.

Image VI.4: Curb Extension

The Walmart Driveway in Salem is recommended for several improvements. The addition of sidewalks are recommended on the northern side to the south of the driveway and three crosswalks are proposed. This is also where the guardrail in the middle of Route 107 exists. It is recommended to remove the guardrail and convert it to a planted median, which would help improve the pedestrian environment.

New sidewalks and crosswalks are also recommended at the intersection of Olde Village Drive, Ravenna Avenue, and at the Salem Hospital Lower Driveway. At the intersection with Jackson Street and Dalton Parkway, crosswalks and an extension of the island between the two roads is recommended to facilitate safer pedestrian crossings. The intersection with Essex Street and Boston Street is recommended for the incorporation of raised shared street space. Shared street spaces are recommended for the corners of the intersection where useable right-of-way was created through the re-alignment of Route 107. A raised shared street in Montreal, shown in Image VI.5, provides an area for both pedestrians and vehicles at low speeds. They can also serve as spaces for recreation and socializing, providing added benefit to pedestrians, while still allowing for the unloading/loading necessities of vehicular traffic in a commercial area. A crosswalk is also recommended across Route 107 at the start of Boston Street. Reconfiguring this intersection would provide more structure and safety between different modes and serve as a gateway to the Route 107 study area in Salem.

Image VI.5: Raised Shared Street

Transit

Study area-wide transit improvements were described in the previous chapter. This section describes some of the transit-specific or stop level recommendations that would be implemented in the long-term.

Recommendations outstanding from the proposed Bus Stop Optimization Plan in Figure V-1 and Figure V-2 (from Chapter V) and in the Bus Stop Consolidation Summary Table (in the Appendix) that cannot be rolled out in the short-term should be considered for implementation in the long-term. Some of these long-term recommendations would be incorporated into the intersection improvements, which are described later in this chapter. The remaining improvements are described below in the order of bus movement with inbound as north to south and outbound as south to north. Estimated impacts on parking required to implement improvements are noted but are approximate.

Inbound stops:

1. Essex Street opposite Warren Street. Relocate the shelter to the recessed area along the existing sidewalk and shift the stop further north closer to the crosswalk and pedestrian path through the adjacent property (currently occupied by CVS).
2. Highland Avenue opposite Salem Hospital. Shift the stop slightly north, closer to the crosswalk to improve left turn movements for vehicles exiting the hospital driveway.
3. Highland Avenue opposite First Street. Investigate the potential to add a crosswalk and connecting sidewalk network to this stop, opposite Hawthorne Commons residential building. If a crosswalk is not feasible consideration should be given to removing the stop to discourage pedestrians and riders from crossing Route 107 across the median guardrail.
4. Western Avenue opposite Buchanan Circle. Add a curb ramp at the existing crosswalk adjacent to its new location far side of the crosswalk at Bellaire Avenue, assumed to have been relocated in the short-term.
5. Western Avenue at Cross Street. Lengthen the existing nearside bus stop by relocating the rear sign, to enable the bus to stop flush to the curb, which would require removal of about two parking spaces. Also, add a curb ramp at the crosswalk to the front of the bus stop.

Outbound stops:

1. Western Avenue at West Colony Road. Shift the bus stop north to the far side of the driveway next to West Colony Road to enable both doors to open to a level sidewalk, which would require removal of about two parking spaces. Add a rear bus stop sign to clearly define the bus stop no parking area. Also, add a curb ramp at the crosswalk.
2. 331 Highland Avenue. Widen the sidewalk at this bus stop to provide a landing area and eliminate the pinch point at the existing utility pole. Also, coordinate with the abutting property owner(s) of the medical buildings to provide a safe and designated pedestrian path alongside the driveway to connect to the sidewalk on Route 107. Although this bus

stop is not currently paired with a stop across the street, it does not appear to be feasible or safe, due to the roadway alignment, grade and speed, to create a crosswalk across Route 107 at this location, and therefore a stop pair is not recommended to be added at this time.

3. Highland Avenue at First Street. As previously mentioned for this bus stop's pair – opposite First Street, investigate the potential to add a crosswalk at this stop, adjacent to the Hawthorne Commons residential building. If a crosswalk is not feasible consideration should be given to removing the stop to discourage pedestrians and riders from crossing Route 107 across the median guardrail.
4. Highland Avenue at Salem Hospital. Improve the adjacent sidewalk to provide a level and ADA compliant path of travel between the landing area and the shelter. Alternatively, consider relocating the stop to the far side of the intersection and crosswalk, in conjunction with the relocation or addition of a shelter and removal of the grass strip to create a landing area.
5. Essex Street at Warren Street. Relocate this stop to the far side of Warren Street, and far side of the crosswalk, for better sidewalk conditions, which would require removal of two or three parking spaces.

Bus stop amenities are recommended to be added to the following stops; the number of boardings at the stops, as of Fall 2014, is also noted, as ridership is one of the primary criteria for adding bus stop amenities:

- Highland Avenue opposite Salem Hospital (74)
- Highland Avenue at Walmart (37)
- Highland Avenue at Hawthorne Square (32)
- Western Avenue at Chestnut Street (42) – behind the sidewalk, in coordination with the property owner(s).

If, upon further investigation or through the design process, a shelter cannot be integrated into the proposed location, one or two benches should be considered instead. A trash receptacle should also be added to each of these locations also.

2. LYNN STUDY AREA RECOMMENDATIONS

The recommended cross-section for the Lynn study area segment of Route 107 includes eight to ten foot sidewalks, and seven foot on-street parking lanes on both sides, a narrow five foot bicycle lane and an 11 foot travel lane in each direction, as depicted in Figure VI-2. Pavement resurfacing improvements are recommended throughout this segment. At some of the key intersections within the Lynn study area, a left turn lane would be incorporated. At approaches to these intersections, parking would not be allowed, and the cross section would consist of three 11 foot lanes and two 6.5 foot bicycle lanes. For perspective on the consequential changes to on-street parking in the southern portion of the study area, refer to Figure VI-3.

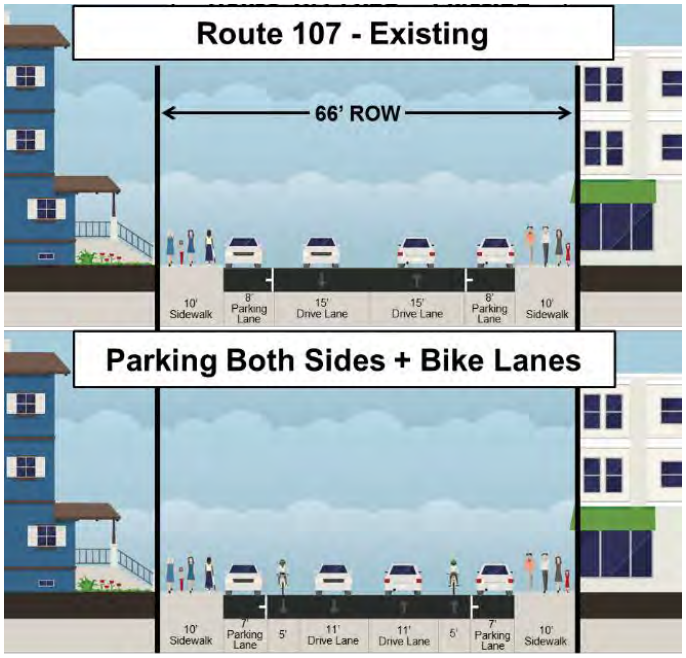


Figure VI-2: Cross-section – Parking Both Sides + Bike Lanes

The available 66 feet of right-of-way for potential improvements limits the space available for multimodal improvements. The recommended section allows for maintenance of parking on both sides of the street while incorporating a bicycle lane. The proposed bicycle facilities would need to be narrow in order to fit, and would not meet current standards for separated bicycle lanes. However, this would allow for a continuous bicycle facility for the entire study length. The narrow unbuffered bicycle lane would only be implemented between Chestnut Street and the Buchanan Bridge, and would temporarily widen to 6.5 feet at all intersections with left turn lanes. Details on implementation of the recommended cross section in the Lynn study area segment are noted below.

Chestnut Street to Buchanan Bridge – This section was developed to maintain the existing parking to the maximum extent possible, while incorporating left turn lanes at key intersections as well as providing dedicated bicycle lanes throughout. Given the existing curb to curb width of 46 feet, 11 foot travel lane widths can be utilized to achieve the minimum 5 foot bicycle lane and seven foot parking lane on each side of the road. While these dimensions are not ideal, the minimums can be achieved without altering the curb line. At intersections with left turn lanes, at each approach parking must be eliminated, leaving room for three 11 foot lanes and a 6.5 foot bicycle lane. The existing 8 - 10 foot sidewalks are wide enough to provide an adequate landing area at bus stops, and can be rebuilt in place to achieve ADA compliance. Intersections within this section include – Western Avenue (Route 107) with Chestnut Street, Chatham Street, Maple Street/Waitt Avenue, and Eastern Avenue/Stanwood Street. Specific improvements proposed at each intersection are noted in section 5.

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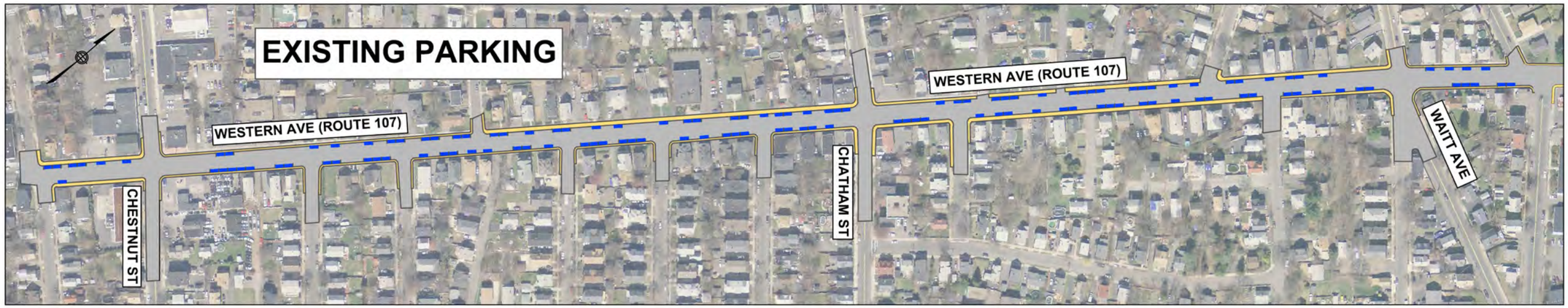

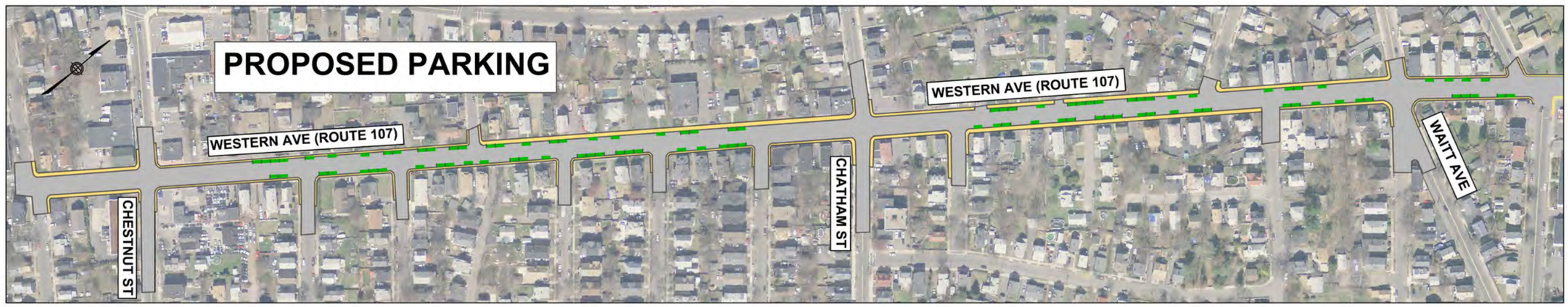

Legend:
- Sidewalk
- Pavement
- Existing on Street Parking
- Proposed on Street Parking

TOTAL EXISTING PARKING 130
TOTAL PROPOSED PARKING 97
NET LOSS 33

ROUTE 107 Lynn Salem Corridor Study

Figure VI-3
Western Avenue (Route 107) Lynn Corridor Parking Impact Analysis
Route 107 Corridor Study
Salem, MA

Buchanan Bridge – The Bridge is fixed at 36 feet curb to curb and no physical improvements are proposed as part of this study. Since there is no parking allowed, a protected buffered bicycle lane can be provided within the existing cross section by restriping with 11 foot lanes, a 2 foot buffer and five foot bicycle lanes on each side. The existing eight foot sidewalks on the structure are adequate and in reasonable conformance with ADA guidelines. (Bridge section shown on Eastern Avenue/Stanwood Street intersection diagram Figure VI-9 in section 5, page 161)

Buchanan Bridge through Fays Avenue to Lynn/Salem City line – Coming off the bridge, the two lane roadway transitions to a three lane cross section to provide a left turn lane at Fays Avenue. There is no on-street parking in this section, so the five foot protected buffered (two foot buffer) bicycle lanes which started on the bridge can be continued without altering the existing 46 foot curb to curb dimension. Existing sidewalks are roughly six feet wide, and can be widened as needed at bus stops to achieve the appropriate landing area width of eight feet. The three lane section at the intersection would consist of two 11 foot travel lanes and a 10 foot northbound left turning lane.

North of Fays Avenue, the roadway tapers back down to a two lane cross section. There is still no on-street parking, so for the approximate 1500 feet of road prior to the transition to four lanes at the city line both the travel and bicycle lanes can be widened. Widening the lanes is recommended in order to maintain the existing 46 foot curb to curb distance, and avoid potentially costly modifications to the existing drainage system. The recommended cross section consists of two 13 foot lanes, and two six foot bicycle lanes each with a four foot buffer.

Additional improvements at the intersection with Fays Avenue are noted in section 5.

3. RETAIL STUDY AREA RECOMMENDATIONS

The recommended cross-section for the retail study area segment (exclusive of the "zig zag" portion described separately below) includes accommodations for vehicles, pedestrians and bicyclists while maintaining vehicular operations. The proposed cross-section includes two 11 foot travel lanes in each direction, separated by a 10 foot planted median, a protected buffered six foot bicycle lane in each direction and six to eight foot sidewalks on both sides of the roadway, as depicted in Figure VI-4.

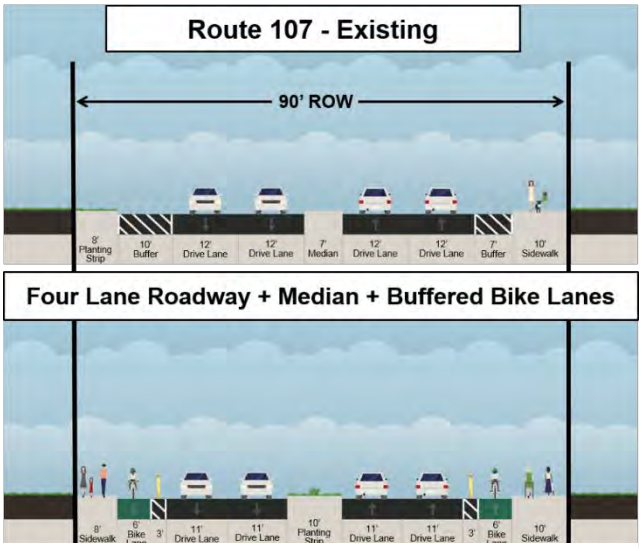

Figure VI-4: Four Lane Roadway + Median + Protected Buffered Bike Lanes

Although there is generally 90 feet of existing right of way, in several areas significant roadside features, including existing ledge may be impacted by developing a cross section equal to this dimension. One of the most critical areas is just north of Olde Village Way, where existing property improvements including elevated walls appear very close to the highway right of way. Based on this, it appears prudent to work within the existing roadway template of approximately 84 feet (back of sidewalk (east) to outer edge of shoulder (west)).

The proposed cross section would allow for incorporation of sidewalks on both sides of the roadway and protected buffered bicycle lanes throughout, as well as conversion of the existing paved median with guardrail to a planted median which could act as traffic calming. If, in the future, completion of a detailed survey reveals adequate space for additional improvements without major impacts, then perhaps 12 foot lanes could be considered for this section.

Resurfacing of the pavement structure is recommended throughout this segment. Details on implementation of the recommended cross section in the Retail study area segment are noted below.

Lynn/Salem City line to "Zig zag" - At the Lynn/Salem City line the roadway transitions to a four lane cross section, with a raised center median. The existing section promotes higher speeds with its freeway atmosphere and paved median. The east side of the road has an existing sidewalk, while the west side does not consistently have a sidewalk.

Working within the existing footprint of the roadway allows for a proposed cross section of four 11 foot lanes, a 10 foot median (eight feet planted), and a six foot bicycle lane and three foot buffer in each direction. Although the planted median would aid in calming traffic speeds, the additional foot of buffer is also recommended here to shield bicyclists. The existing six foot sidewalks along the east side can be reconstructed in place (and widened to eight feet as needed at proposed bus stop locations), and adequate room within the existing roadway template exists on the west side to provide new sidewalks where none exists today for the length of this section. At intersections which require left turn lanes, utilizing the width provided by the planted median would allow for installation of 10 foot turning lanes.

Intersections within this section include the Wal-Mart Entrance, Olde Village Drive, and Barnes Road/Ravenna Avenue. Additional specific improvements proposed at each intersection are noted in section 5.

Highland Avenue at Swampscott Road/Dipietro Avenue and Highland Avenue at Marlborough Road/Traders Way ("Zig zag") – The proposed roadway improvements to the Highland Avenue at Swampscott Road/Dipietro Avenue intersection, and the Highland Avenue at Marlborough Road/Traders Way intersection (Zig zag) are limited due to several constraints including the proximity of Thomas Circle, ledge, walls, parking areas, elevation difference with abutting properties, and the existing alignment of Dipietro Avenue. These constraints made any widening of Highland Avenue between these two intersections extremely difficult and costly. Therefore, alternatives to reroute traffic and eliminate the need for expanding the number of vehicle lanes were explored. The alternative prohibits the "zig zag" movement on Route 107 between Swampscott Road and Marlborough Road and reroutes the movement through Traders Way and First Street. For this alternative, improvements would occur at the following intersections:

- Highland Avenue at Swampscott Road/Dipietro Avenue
- Highland Avenue at Marlborough Road/Traders Way
- Swampscott Road at First Street
- First Street at Traders Way

The existing curb to curb roadway width on Highland Avenue throughout the zig zag is approximately 70 feet with a 10-foot wide sidewalk on the east side of the road. Given this width, the study would provide bicycle accommodations through five foot bicycle lanes; however, they would not be buffered due to roadway constraints. Like the remainder of the retail study area, there would be no parking accommodations on Highland Avenue. A sidewalk would be added on the west side of Highland Avenue. Transit accommodations in the form of bus stop features such as shelters, signage, and pedestrian improvements would be provided on Highland Avenue. The alternative has four 11 foot lanes within the zig zag which results in increased safety due to potentially slower traffic speeds. Due to the minimal cross-section width, this section would have back-to-back ten foot left turn lanes separated by a two foot median. The two-foot wide median would likely be concrete due to the limited width available unlike the other parts of the retail study area where an aesthetically pleasing median is provided.

In order to restrict the zig zag movement, two foot wide lane barriers are proposed between the through travel lanes as shown in Section V for Highland Avenue at Swampscott Road/Dipietro Avenue and Highland Avenue at Marlborough Road/Traders Way. The lane barriers may consist solely of pavement markings. Vertical separation could also be applied in the form of concrete barrier or flexible delineator posts, as shown in the images below. In clockwise order beginning at the top left, these images are from Long Island, New York; Gijon, Spain; Seville, Spain; and San Diego, California. A local example of a lane barrier is the I-93 HOV image shown below. The type of lane barrier would require further consideration with attention to maintenance requirements, effectiveness of barrier type, and cost.

Lane Barrier Examples

Local I-93 Lane Barrier Example

Several concerns were raised in the public comment period regarding the efficacy of both lane barriers within the Route 107 roadway and the value of redirecting Marlborough-Swampscott movements off Route 107 and onto Traders Way and First Street. This report's analysis shows that traffic operations could not be substantially improved by adding capacity to the Marlborough Road and Swampscott Road intersections. The alternatives that involved the redirection of Marlborough-Swampscott movements via Traders Way and First Street resulted in significant improvements to the traffic operations. Level of service for this option improves from an F to an E at the Marlborough Road/Traders Way intersection, a D to a B at the Swampscott Road/Dipietro Road intersection, a B to an A at the Traders Way and First Street intersection, and an F to an E at the Swampscott Road and First Street intersection. These improvements are dependent upon traffic signal adjustments and re-orientation of the First Street and Swampscott Road intersection to encourage the redirected movements.

These improvements would be best achieved by the introduction of lane barriers within the Route 107 roadway, signalization and new channelization at the Swampscott Road and First Street intersection, and through coordinated signalization at the Route 107/Marlborough Road, Traders Way/First Street, and Swampscott Road/First Street intersections to favor these through movements. Modifications at the Swampscott Road and First Street intersection include signalization of the intersection, addition of a traffic signal, an additional left turn lane on First Street and an additional right turn lane on Swampscott Road.

Implementation of these two improvements without lane restrictions would likely result in a modest improvement in traffic operations. If the lane restrictions were to be established using only signage and pavement markings with no vertical separation enforcement of the turn restrictions would become a challenge and overall effectiveness of the new movement curtailed. If lane barriers are implemented, enforcement of the turn restrictions becomes less of a challenge. However, the presence of the vertical barriers increases maintenance obligations, particularly in regards to snow plowing, and could result in driver confusion. The details of lane separation require additional consideration and coordination during the design phase.

Further study is necessary to more comprehensively evaluate the traffic operations along Traders Way and First Street in peak periods, including to project the amount of traffic likely to be re-routed and identify improvements along Traders Way and First Street which may be necessary to handle the added traffic. Specific improvements proposed at each intersection are noted in section 5.

Hawthorne Square Mall entrance to Freeman Road – Proceeding north from the zig zag section, the roadway once again has a four lane section similar to the retail section north of Wal-Mart. The existing section promotes higher speeds with a paved median and no on-street parking. Between intersections, the curb to curb width is roughly 70 feet, widening to approximately 84 feet at the Hawthorne Square Mall intersection. This allows for a proposed cross section of four 11 foot lanes, a 10 foot median (eight feet planted), and a five foot bicycle lane and three foot buffer in each direction. Although the planted median would aid in calming traffic speeds, the additional foot of buffer is also recommended here to shield bicyclists. At the Hawthorne Square Mall intersection, 11 foot left turning lanes are recommended. Dropping the

exclusive southbound right turn lane would allow room to provide the bicycle lanes and buffer through the intersection without the need for roadway widening, without a deleterious effect on traffic operations. Other improvements proposed at the Highland Avenue intersection with Hawthorne Square Mall are detailed in section 5.

4. NORTHERN STUDY AREA RECOMMENDATIONS

The recommended cross-section for the Northern study area segment of Route 107 includes six to eight foot sidewalks, a six foot (primarily unbuffered) bicycle lane and an 11 foot travel lane in each direction, as depicted in Figure VI-5. In addition, for the majority of the segment length, a 12 foot center two-way left turn lane (TWLTL) would be incorporated. Similar to the other segments, pavement resurfacing is recommended in the northern segment.

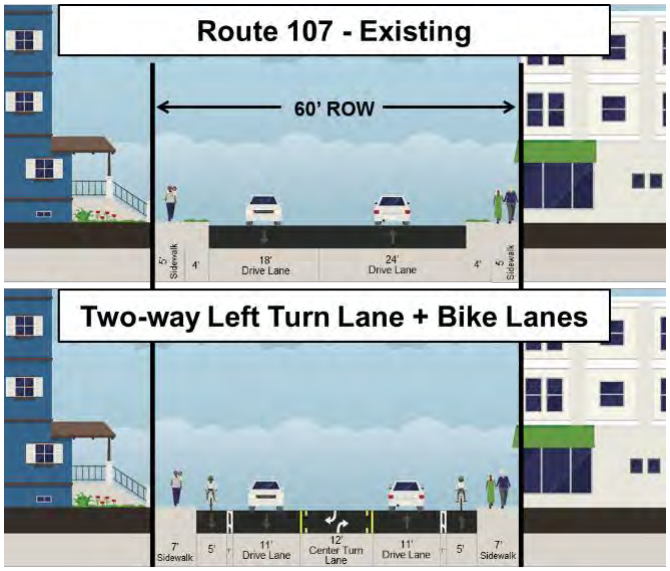

Figure VI-5: Cross-section – Two-way Left Turn Lane + Bike Lanes

Freeman Road to Willson Street/Cherry Hill Avenue – This area is a transition section from the four-lane retail study area to the three-lane section proposed for the northern leg of the study area. The proposed design is to carry two 11 foot lanes northbound to Willson Street. Approaching Willson Street, the right lane would become a right-turn only lane, with the northbound six foot bicycle lane crossing to be in-between the two travel lanes to prevent right turning traffic from crossing their path. Southbound, there would only be one 12 foot travel lane until after the roadway passes under the existing pedestrian bridge, which is the major design constraint in this section. The curb to curb width is approximately 50 feet here, with the bridge abutments directly behind the existing eight foot sidewalks. This condition extends north to Willson Street with existing property improvements and walls right at the back of sidewalk making any widening potentially extremely costly (approximately 48 feet curb to curb).

Based on these considerations, in order to maintain consistent bicycle lanes through this section, the recommended design is for only one southbound travel lane under the bridge, opening up to two 11 foot southbound lanes between Crowdis Street and Freeman Road. The exception to this would be at the Willson Street intersection, where two southbound through lanes would be necessary to accommodate southbound Route 107 traffic, and the double left turn lanes from Willson to southbound Route 107. For this short stretch (100 – 200 feet) the bicycle lane would be eliminated and sharrows would guide bicyclists until the 6 foot lane can be redeveloped as the roadway returns to one southbound travel lane.

The proposed cross-section between Willson Street and the pedestrian bridge is the critical section in attempting to provide a consistent bicycle lane throughout the study area. As design progresses, a detailed survey of this area would provide more information regarding dimensions available, and perhaps consideration of reduction in travel lanes or sidewalk widths and/or minor roadway widening could allow adequate room for a consistent southbound bicycle lane and/or an additional travel lane. There is also potential opportunity to explore shifting the northbound bicycle lane off of Route 107 and onto Salem High School property from just south of the pedestrian bridge to Willson Street (see Figure VI-22 in section 5, page 181). Shifting the bicycle lane off road could allow enough room to more fully develop other cross-section elements.

Other improvements proposed at the Highland Avenue intersection with Willson Street/Cherry Hill Avenue are noted in section 5.

Willson Street/Cherry Hill Avenue through Jackson Street/Dalton Parkway intersection – North of Willson Street, the proposed cross section transitions to a three lane section with no on street parking. Again, to minimize impacts such as right of way and cost, working within the existing 46 foot curb to curb dimension, this alternative consists of two 11 foot lanes and a 12 foot center two way left tuning lane (TWLTL), with six foot unbuffered bicycle lanes in each direction. There are existing six to eight foot sidewalks on both sides of the road that can be reconstructed to be in accordance with ADA guidelines.

The above described section would extend through the Salem Hospital Lower Driveway where a new left turn lane would be installed in the northbound direction, after which the TWLTL section would resume for a short distance to the north. Approaching the Jackson Street/Dalton Parkway intersection, the center turning lane would be temporarily discontinued, in order to develop an exclusive right turn only lane northbound approaching Jackson Street. Similar to the Willson Street intersection, the bicycle lane would cross from the curb line to in-between the two travel lanes to prevent right turning traffic from crossing their path.

On the opposite (southbound) side of the Jackson/Dalton intersection a left turn lane would be developed, before the section transitions back to a TWLTL heading north toward Boston Street. North of Dalton Parkway, there appears to be additional width available to reestablish a 2 foot buffer between the bicycle lanes and travel lanes to Boston Street.

At the existing Jackson Street/Dalton Parkway intersection, Route 107 southbound widens by approximately six feet to add a short stretch to provide space for approximately three on-street parking spaces. The recommended alternative is to remove this parking and shift the roadway slightly utilizing this space to better align travel lanes on either side of the intersection. Throughout the entire intersection, vehicle, bicycle and pedestrian paths would be clearly marked to better assign space.

Additional specific improvements proposed at each intersection are noted in section 5.

Essex Street/Boston Street intersection – For this intersection, one of the study goals was to realign Route 107 to have it become the through movement, which is from Essex Street to Boston Street. The existing alignment has wide median areas separating directions of travel on Essex Street south of the intersection. In order to realign the intersection, it was necessary to shift the curb line away from existing residences and businesses, and eliminate this vast median. As Essex Street only requires a 3 lane section approaching Boston Street, this realignment created a large amount of useable space (up to 35 feet) between the proposed curb line and the existing back of the sidewalk on both sides of the roadway. Since access is still required for the existing residences and businesses that have frontage near the intersection, the recommended alternative includes converting the majority of this useable area to a "shared street" for vehicle access, bicycles and pedestrians (see Figure VI-25 in section 5, page 186). The shared street would be at the level of the sidewalk with the 6 foot bicycle lanes ramping onto it at either end, and driveway access points placed at strategic locations ramping onto the shared space as well. Pedestrians, bicycles and vehicles could move about freely over the entire area. Only vehicles requiring access to the abutting properties would need to access the space. An area within each shared street could be reserved for landscaping (or relocation of the existing monument at the northern end of intersection), preferably toward the curb to help buffer the shared street from the through roadway. The shared street area on the northwesterly side of the intersection (in front of Mandee's Pizza) would be for bicycles and pedestrians only.

The roadway cross section along Essex Street approaching the intersection northbound would transition from the TWLTL to a through and right turn lane northbound and a through southbound. Boston Street would be one through lane north (west) bound, and a through and a left turn lane south (east) bound. Essex Street southbound would tee into Route 107, with both a left and right turn lane, while northbound would be one through lane. All vehicle travel lanes are proposed to be 11 feet. All intersection approaches would have a 6 foot bicycle lane that ramps onto the shared street, and 8 foot sidewalks connecting to the shared street as well.

Other improvements proposed at the Essex Street intersection with Boston Street are noted in section 5.

5. INTERSECTIONS

This section describes the conceptual intersection improvements provided in Figure VI-6 through Figure VI-25.

For transit, Figure V-1 and Figure V-2 (in Chapter V), and the Bus Stop Consolidation Summary Table (in the Appendix) summarized the proposed improvements at each stop that are described below as part of the intersection improvements.

Summaries of the capacity analysis for the recommended improvements are provided in the report Appendix and include information on the levels of service, delay and queue lengths.

Western Avenue at Chestnut Street (see Figure VI-6).

Proposed improvements at this location include the following:

To improve safety, left turn lanes were added on Route 107 for both the northbound and southbound approaches. Left turn lanes were also added to both approaches on Chestnut Street. To improve traffic operations, traffic signal timings were optimized and signal coordination was improved. To facilitate installation of the left turn lanes, parking was removed in the immediate vicinity of the intersection. The installation of exclusive left turn lanes at each of the intersection approaches minimally increases the overall delay between No Build and Build conditions by approximately five seconds in each of the peak hour periods. All approaches to the intersection are expected to operate under capacity. Queue lengths are expected to increase along the Route 107 approaches (northbound and southbound) but are not shown to impact operations at the surrounding intersections.

The intersection is expected to operate at overall LOS D or better under the 2035 Build condition during the weekday morning, weekday afternoon, and Saturday midday peak hours.

Improvements to the crosswalks and pedestrian facilities are proposed in accordance with ADA, and bicycle lanes with bicycle boxes have been introduced at the intersection.

Access management is recommended to consolidate driveways and points of conflict where feasible.

Transit improvements include the retention of the inbound stop nearside of Chestnut Street with the addition of a bench, in coordination with the abutting property owner(s). At the outbound stop, rider safety and turn movements for buses turning left onto Chestnut Street are improved by relocating the stop away from the gas station driveways to the far side of Tucker Street, which requires the removal of two parking spaces. Bus stop pavement markings are recommended to deter parking.

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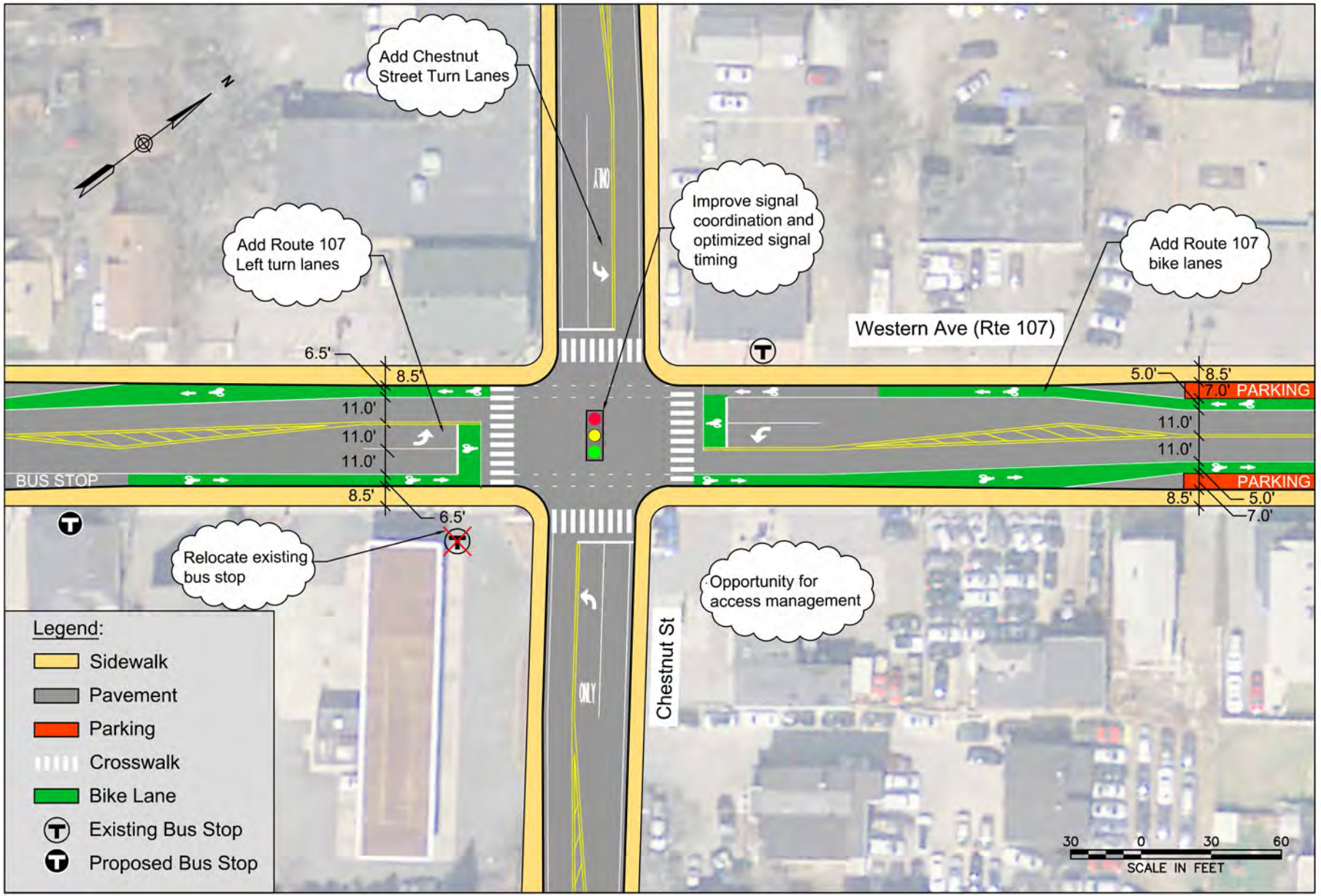

ROUTE 107 Lynn Salem Corridor Study

Figure VI-6
Western Avenue (Route 107) at Chestnut Street
Route 107 Corridor Study
Lynn/Salem, MA

Western Avenue at Chatham Street (see Figure VI-7).

Proposed improvements at this location are similar to those at Chestnut Street and include the following:

For safety improvements, left turn lanes are proposed on both approaches of Route 107 and on both approaches of Chatham Street. The traffic signal timings optimization and signal coordination improvements are recommended. Consequentially, removal of parking in the immediate vicinity of the intersection to facilitate installation of the left turn lanes is recommended.

The proposed exclusive left turn lanes are expected to improve safety at the intersection. However, the safety improvements are shown to increase the overall intersection delay by approximately five seconds between the No Build and Build conditions. The intersection is expected to operate at overall LOS D or better under the 2035 Build condition during the weekday morning, weekday afternoon, and Saturday midday peak hours. Queueing is shown to extend slightly, but is expected to be contained within the available storage area of the intersections.

Recommendations for pedestrians include the improvement of crosswalks and pedestrian facilities in accordance with ADA. Bicycle lanes with bicycle boxes at the intersection are recommended.

Implementation of access management by consolidating driveways is recommended where feasible.

For transit, relocation of the existing inbound stop away from the existing driveway to the far side of Ryans Terrace is recommended, and requires the removal of three parking spaces. The outbound stop is recommended to shift slightly to the south, in front of a residential building, once the length between the two driveways is verified as 30 feet or longer to enable both doors to open to a level sidewalk. Formalizing the driveway aprons could help to maximize the curbside space. The loss of one or two parking spaces is anticipated.

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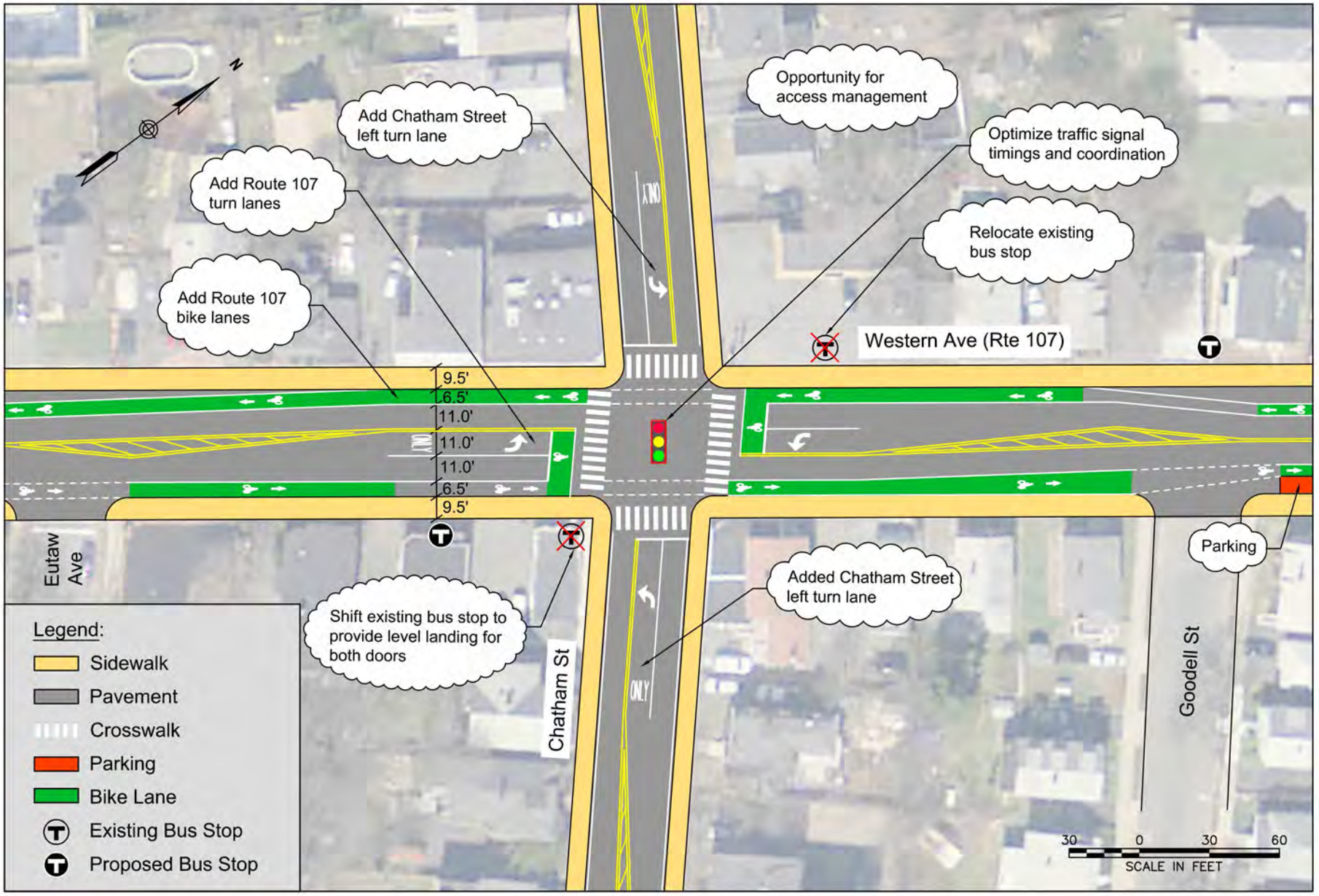

ROUTE 107 Lynn Salem Corridor Study

Figure VI-7
Western Avenue (Route 107) at Chatham Street
Route 107 Corridor Study
Lynn/Salem, MA

Western Avenue at Maple Street and Waitt Avenue (see Figure VI-8).

Proposed improvements at this location include the following:

To improve traffic operations, recommendations include adding a left turn lane on Maple Street, adding a left turn lane on Waitt Avenue, and optimizing the traffic signal timings and improving signal coordination. The installation of the left turn lanes necessitates the removal of parking in the immediate vicinity of the intersection. The addition of left turn lanes and the improvements to the signal timings reduces the overall delay between the No Build and Build conditions at the intersection in the weekday morning, weekday afternoon, and Saturday midday peak hours. The changes also improve the capacity at the intersection, bringing the maximum volume to capacity ratio to under 1.00 in the weekday afternoon and Saturday midday peak hours and under 1.10 in the weekday morning peak hour. A volume to capacity (v/c) ratio compares the roadway demand with the roadway capacity and a v/c ratio under 1.0 indicates that the demand has not exceeded the capacity. The level-of-service for the eastbound Maple Street approach improves from LOS F to LOS E or better under all three peak hours studied. Queue lengths are expected to increase along the Route 107 approaches (northbound and southbound) but are not shown to impact operations at the surrounding intersections.

The intersection is expected to operate at overall LOS D under the 2035 Build condition during the weekday morning, weekday afternoon, and Saturday midday peak hours.

Improvements to crosswalks and pedestrian facilities in accordance with ADA are recommended and bicycle lanes with bicycle boxes are proposed at the intersection.

Improve the President Street alignment at its intersection with Waitt Avenue.

For transit, the inbound stop is recommended to remain in its current location although it should be lengthened, which would require the removal of one or two parking spaces, pending the outcome of intersection improvements at Eastern Avenue. At the outbound stop at Waitt Avenue, buses currently stop in the driveway or overhang the side street. Shifting the stop slightly north to the far side of the driveway to enable both doors to open to a level sidewalk is recommended.

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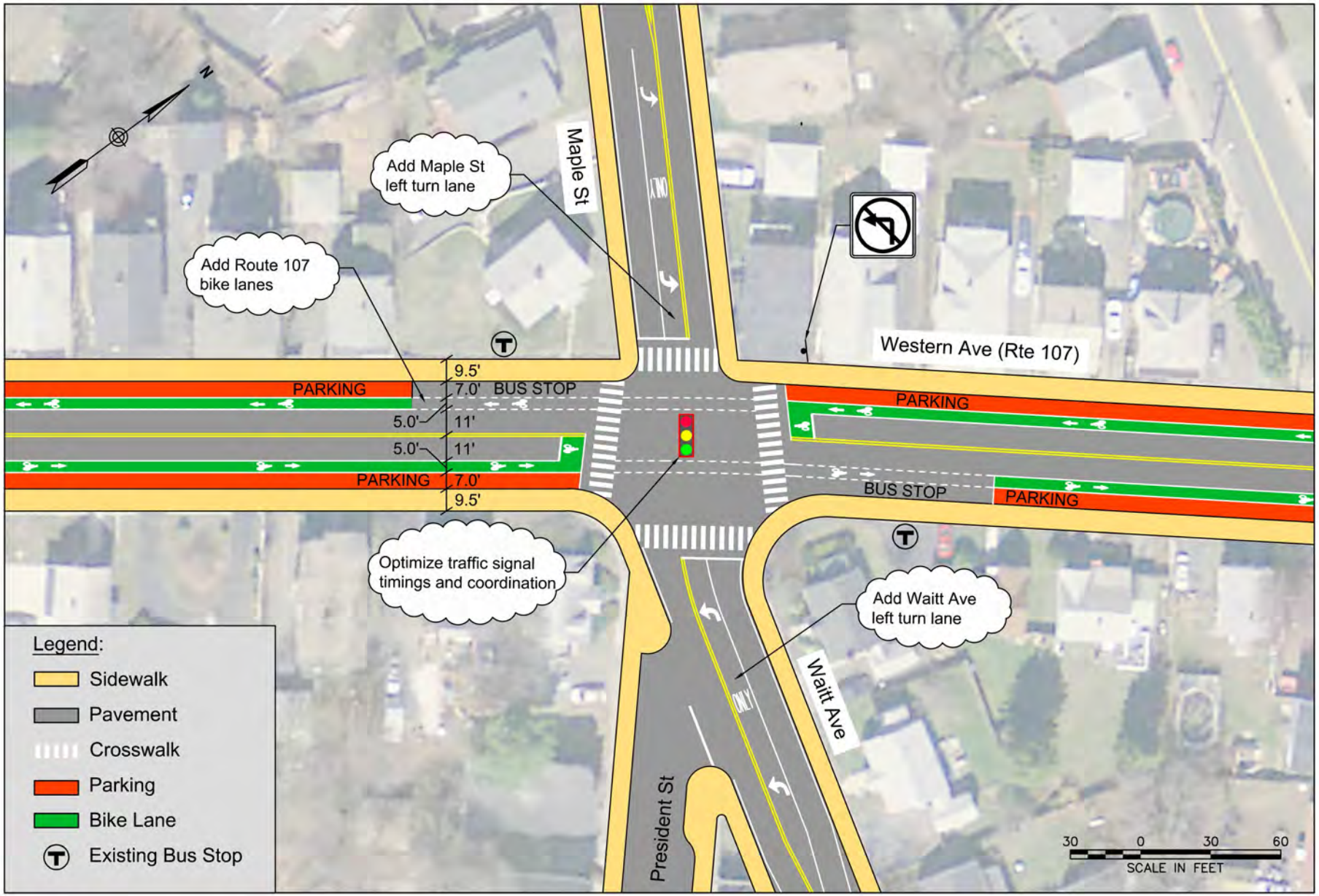

ROUTE 107 Lynn Salem Corridor Study

Figure VI-8
Western Avenue (Route 107) at Maple Street and Waitt Avenue
Route 107 Corridor Study
Lynn/Salem, MA

Western Avenue at Stanwood Street and Eastern Avenue (see Figure VI-9).

Proposed improvements at this location include the following:

Installation of a new traffic signal to be coordinated with the adjacent signals along the study area is recommended. The addition of a left turn lane on Route 107 southbound is also recommended to improve operations and safety. The installation of the traffic signal at Stanwood Street and Eastern Ave significantly improves the level-of-service for the minor street approaches between the 2035 No Build and 2035 Build conditions. The v/c ratio for the eastbound Stanwood Street approach improves from well over 1.00 to under capacity. Restricting the westbound approach to right-only improves the level-of-service for the westbound approach from LOS F in the 2035 No Build condition to LOS B or better in the 2035 Build condition for all three studied peak hours. With the addition of the traffic signal and the southbound left turn lane, the intersection approaches on Route 107 operates at LOS C or better. Queues along the minor street approaches are greatly reduced under the 2035 Build condition and 50th percentile queues along Route 107 due to the installation of the signal are not expected to impact the intersection of Western Avenue at Maple Street and Waitt Avenue. If queue spillback is shown to occur with the new signal, coordination can be adjusted.

The intersection is expected to operate at overall LOS C or better under the 2035 Build condition during the weekday morning, weekday afternoon, and Saturday midday peak hours.

The provision of a curb extension at the end of the parking lane northbound approaching Eastern Avenue is recommended to create a “gateway” effect and to reduce the pedestrian crossing. A planted island has been proposed to facilitate a right turn only movement from Eastern Avenue to Route 107 northbound (left turns prohibited)

Pedestrian facilities in accordance with ADA and crosswalks are recommended. For bicyclists, bicycle lanes with bicycle boxes are proposed at the intersection. The protected buffered bicycle lane begins just north of Linton Road.

In terms of short-term transit improvements, the inbound and outbound stops at this intersection are proposed for removal.

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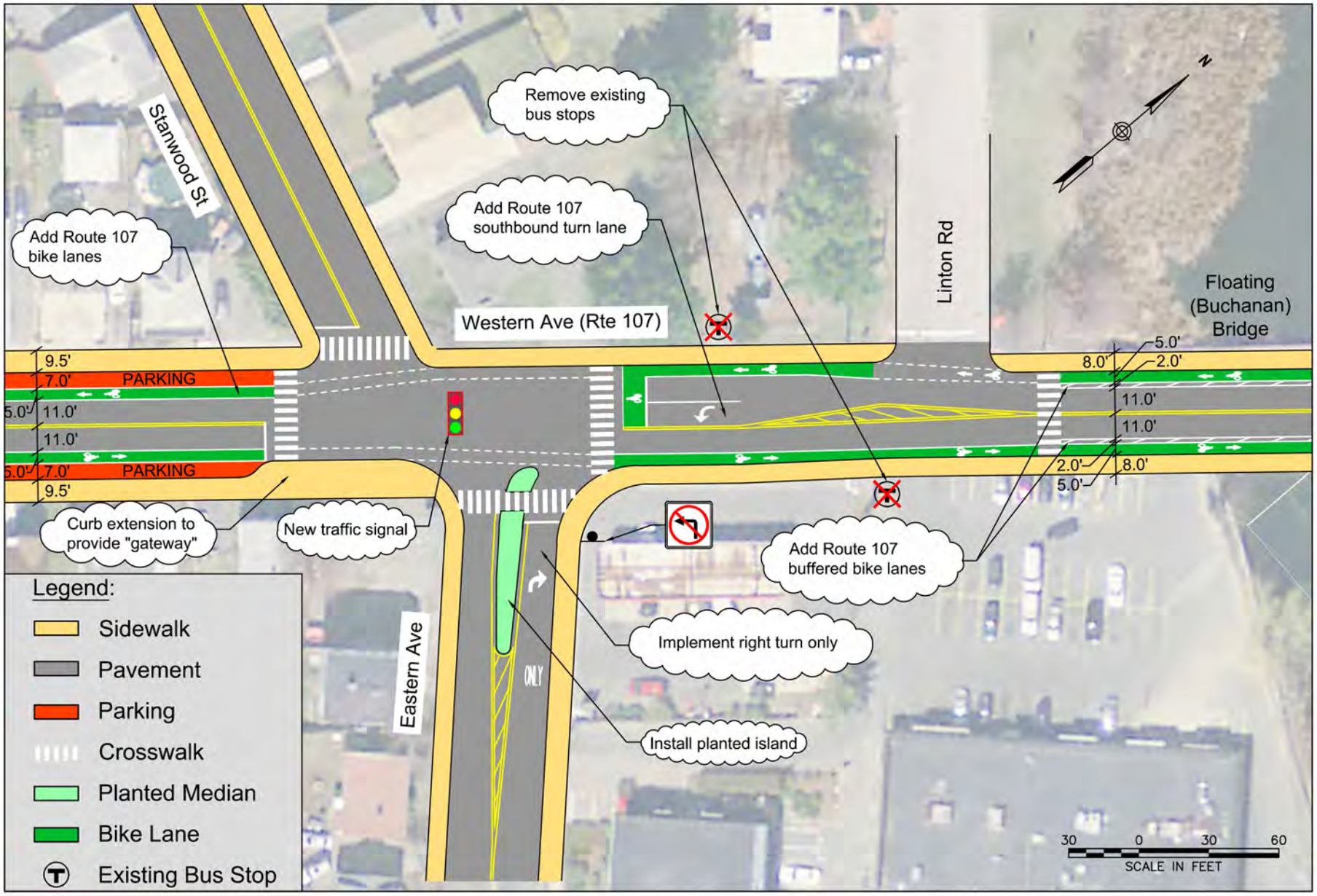

ROUTE 107 Lynn Salem Corridor Study

Figure VI-9
Western Avenue (Route 107) at Stanwood Street and Eastern Avenue
Route 107 Corridor Study
Lynn/Salem, MA

With the proposed banned westbound left turn from Eastern Avenue onto Western Avenue, MBTA Bus Route 424 would no longer be able to continue its current inbound routing. Route 424 inbound trips currently travel westbound on Eastern Avenue, then turn left to head south on Western Avenue. Outbound trips currently operate from Western Avenue, right onto Waitt Avenue, and then right onto Eastern Avenue. To facilitate this new potential intersection control it is proposed that the inbound and outbound routing are flipped. This would maintain service on the same streets, just in the opposite direction, as shown in Figure VI-10. Four bus stops are affected by the change, and affect zero riders boarding, and four riders alighting (based on APC Fall 2014 data). Due to the proximity of existing bus stops, replacement bus stops are not proposed. The inbound bus stop on Western Avenue at Maple Street would also need to be lengthened to accommodate buses that would turn left from Waitt Avenue, and enable buses to pull flush to the curb. The removal of one or two parking spaces is anticipated.

Alternatively, the MBTA may wish to consider a more direct routing for inbound and outbound trips along Waitt Avenue.

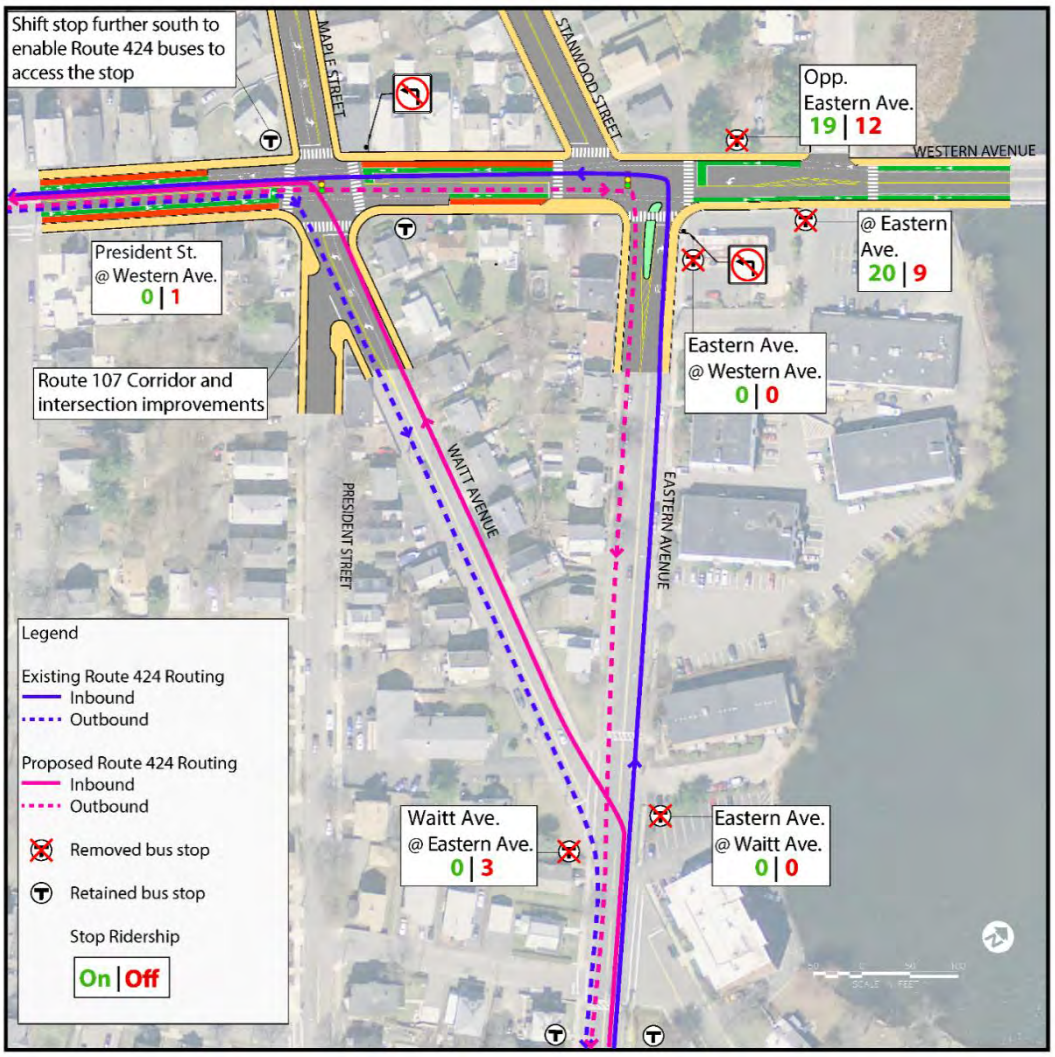

Figure VI-10: Bus Route 424 Existing and Proposed Routing

Western Avenue at Fays Avenue (see Figure VI-11).

Proposed improvements at this location include the following:

Optimize the traffic signal timings and improve signal coordination.

The intersection is expected to operate at overall LOS B under the 2035 Build condition during the weekday morning, weekday afternoon, and Saturday midday peak hours.

The existing six foot sidewalks should be reconstructed in place in accordance with ADA guidelines, and the introduction of protected buffered bicycle lanes with a northbound bicycle box are proposed at the intersection. Improvements to all crosswalks and pedestrian facilities in accordance with ADA are recommended.

For transit recommendations, relocate the inbound stop from the nearside to the far side of the intersection in conjunction with sidewalk widening at the landing area. At the outbound stop widen the sidewalk at the landing area.

Western Avenue/Highland Avenue Study Area Transition (see Figure VI-12)

Western Avenue/Highland Avenue transitions from a two-lane roadway to a four-lane roadway between Fays Avenue and the Walmart Driveway. Proposed improvements at this location include the following:

The existing six foot sidewalks shall be reconstructed in place in accordance with ADA guidelines, and protected buffered bicycle lanes are proposed throughout the transition. The existing pedestrian facilities should be improved to conform with ADA.

The removal of the guardrail is recommended and the existing paved median is recommended to be converted to a planted median.

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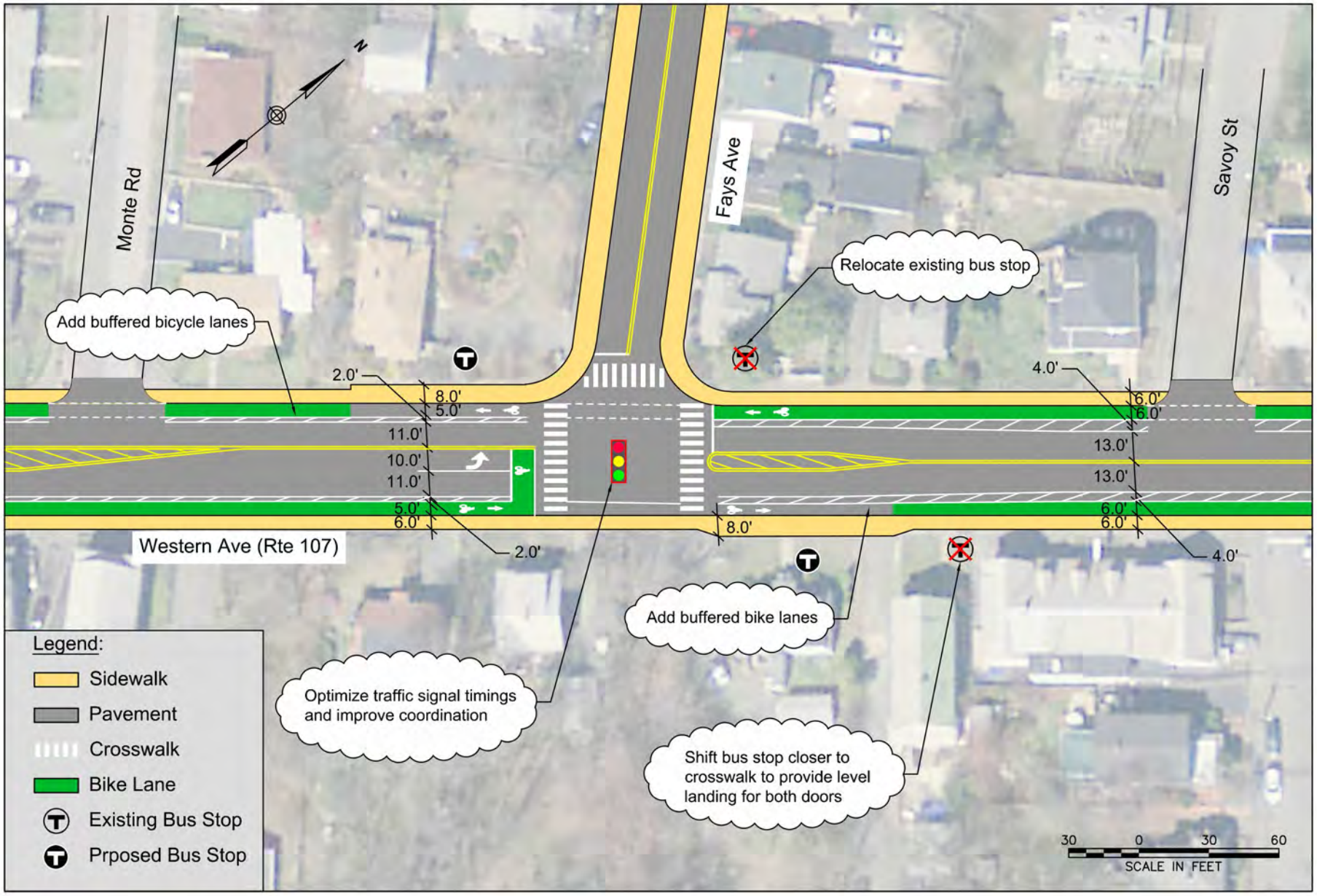

ROUTE 107 Lynn Salem Corridor Study

Figure VI-11
Western Avenue (Route 107) at Fays Avenue
Route 107 Corridor Study
Lynn/Salem, MA

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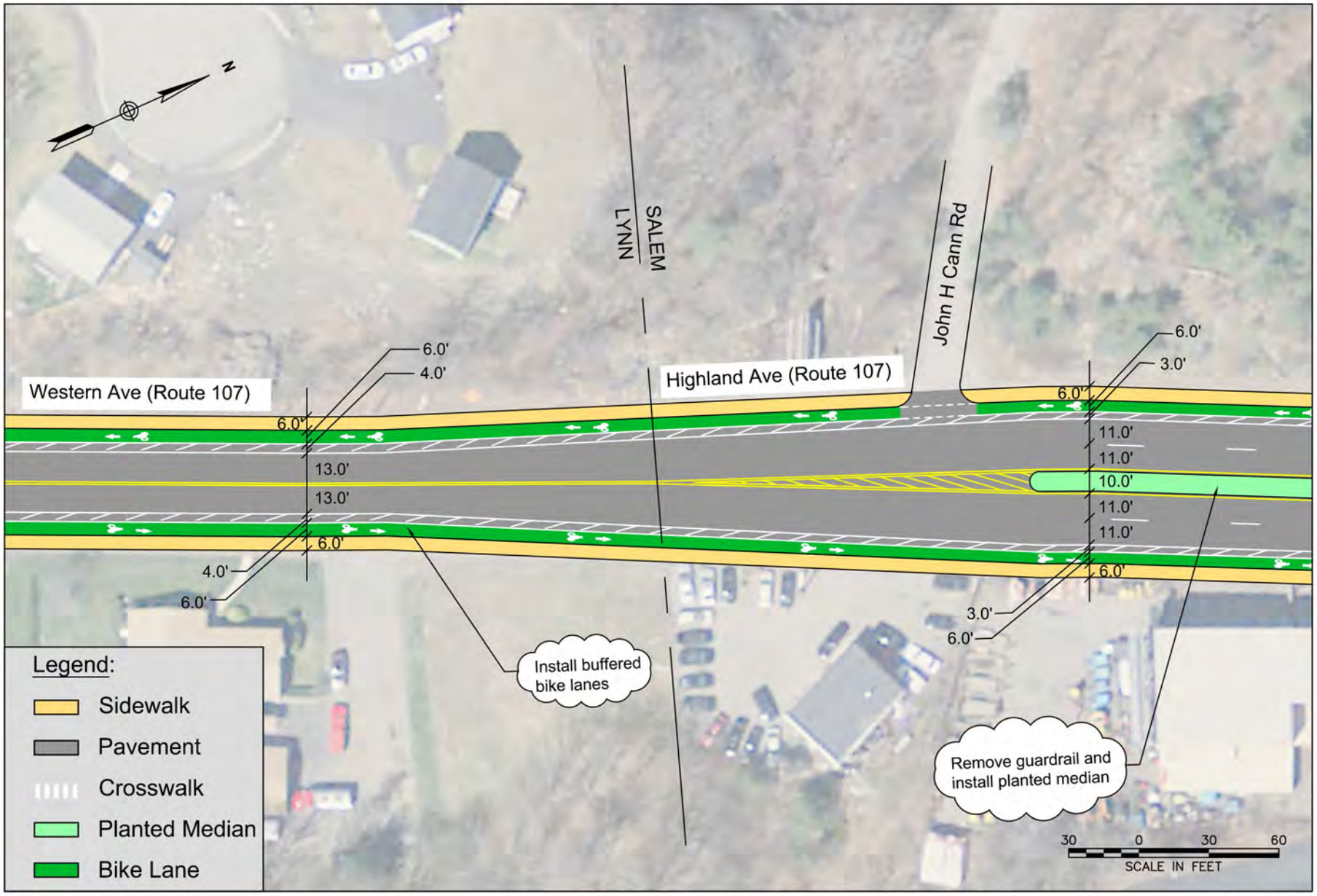

ROUTE 107 Lynn Salem Corridor Study

Figure VI-12
Western Avenue/Highland Avenue (Route 107) Corridor Transition 1
Route 107 Corridor Study
Lynn/Salem, MA

Highland Avenue at Walmart Driveway (see Figure VI-13)

Proposed improvements at this location include the following:

The elimination the exclusive right turn lane on the southbound Route 107 approach is recommended as this lane is not necessary based on traffic operations. Improvements to traffic signal timings and coordination are recommended.

With the signal timing adjustments and the conversion of the southbound approach, the intersection is expected to operate at overall LOS B or better under the 2035 Build condition during the weekday morning, weekday afternoon, and Saturday midday peak hours. Queueing is not expected to be significantly altered by the changes at the intersection.

Consistent with the proposed cross section in this segment, the existing paved median with guardrail is recommended to be replaced with a planted median. The improvement of existing crosswalks, the implementation of new crosswalks, and the extension of the planted median through the crosswalk would provide a refuge for pedestrians. New sidewalks are recommended to be installed on the west side of Route 107 and existing sidewalks on the east side are recommended to be reconstructed in accordance with ADA guidelines. Protected buffered bicycle lanes with a northbound bicycle box are proposed at the intersection.

Transit improvements are recommended to include the relocation of the existing stop from the southern Walmart entrance to the far side of the Walmart Driveway, in conjunction with construction of a sidewalk and landing area, and a sidewalk connection to Walmart. Also recommended is the relocation of the temporary stop far side of the crosswalk (assumed to have moved north of the crosswalk in the short-term) to the original stop location, south of the southern crosswalk, in conjunction with a widened sidewalk and landing area, and clearances that meet ADA requirements.

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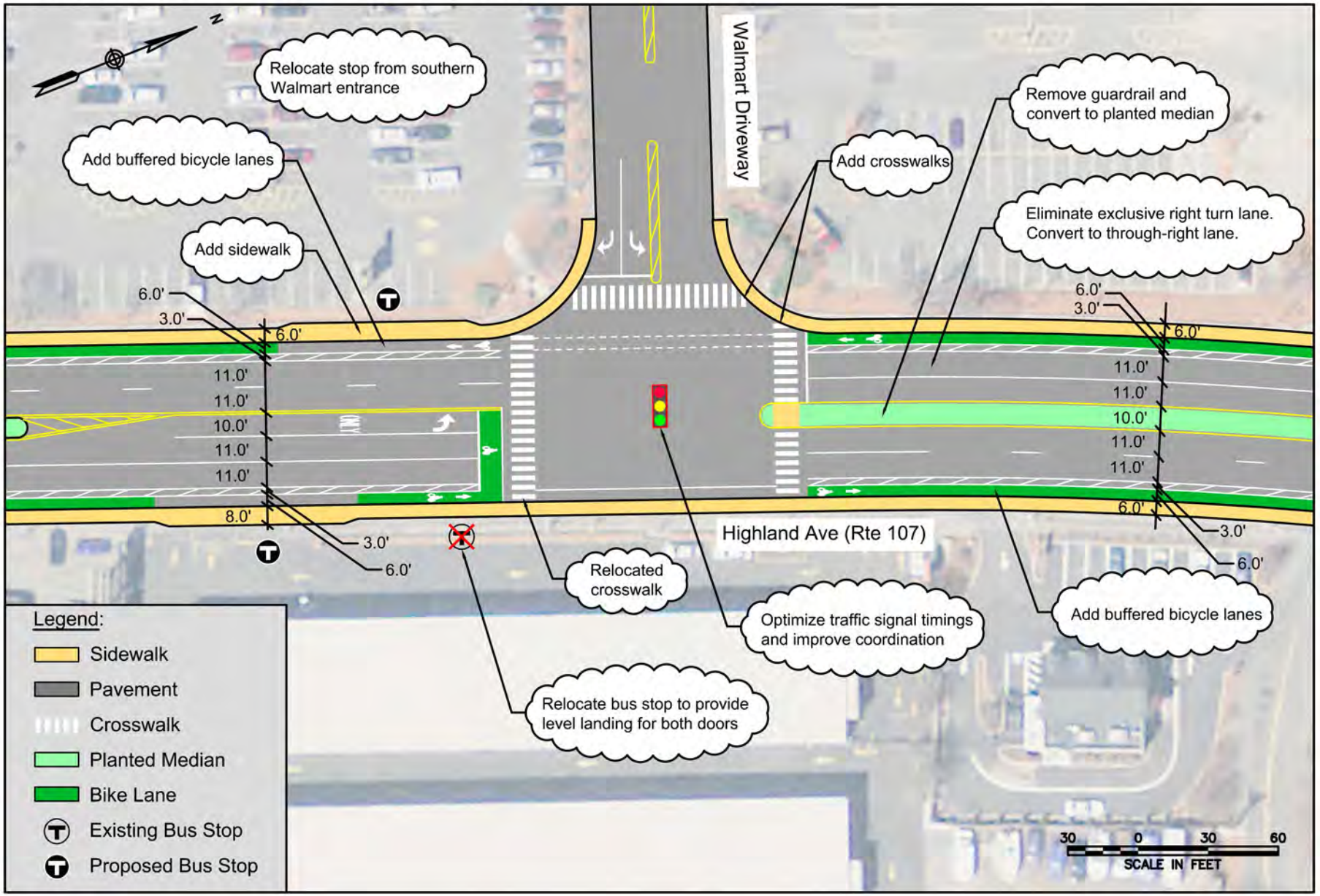

ROUTE 107 Lynn Salem Corridor Study

Figure VI-13
Highland Avenue (Route 107) at Walmart Driveway
Route 107 Corridor Study
Lynn/Salem, MA

Highland Avenue at Olde Village Drive (see Figure VI-14).

Proposed improvements at this location include the following:

Traffic signal timings coordination improvements are recommended.

The intersection is expected to operate at overall LOS A under the 2035 Build condition during the weekday morning, weekday afternoon, and Saturday midday peak hours.

The median is recommended to be converted from the existing paved median with guardrail to a planted median. Existing crosswalks are recommended to be improved, missing crosswalks are recommended to be added, and the extension of the planted median through the crosswalk is recommended to provide a refuge for pedestrians. The installation of new sidewalks on the west side and the reconstruction of existing sidewalks on the east side in accordance with ADA guidelines are recommended. Protected buffered bicycle lanes with a northbound bicycle box are proposed at the intersection.

For transit, the retention of the existing inbound stop at Rich's Plaza is suggested but with the removal of a section of the existing grass strip to provide a landing area. The outbound stop should be retained nearside, but with a raised height of the bus stop sign, trimming of overgrowth at the back of sidewalk to improve the visibility of the stop, and the removal of a section of the existing grass strip to provide a landing area.

Highland Avenue at Barnes Road and Ravenna Avenue (see Figure VI-15).

Proposed improvements at this location include the following:

Traffic signal timings and signal coordination improvements are recommended and reflected in the projected Build condition capacity analysis results.

The intersection is expected to operate at overall LOS B or better under the 2035 Build condition during the weekday morning, weekday afternoon, and Saturday midday peak hours.

Median recommendations call for the removal of the guardrail and the conversion of the existing paved median to a planted median. New and improved crosswalks are recommended, as well as the installation of new sidewalks on the west side and reconstructed sidewalks on the east side in accordance with ADA guidelines. Protected buffered bicycle lanes with bicycle boxes are proposed at the intersection.

For transit recommendations, the relocation of the inbound stop from the temporary nearside stop to the original far side location is recommended. This is recommended to be done in conjunction with construction of a sidewalk and landing area that meet ADA requirements. Relocation the outbound stop to the far side of the intersection for improved transit operations, in conjunction with the addition of a crosswalk on the northern leg of the intersection, and associated sidewalk and intersection improvements is also recommended.

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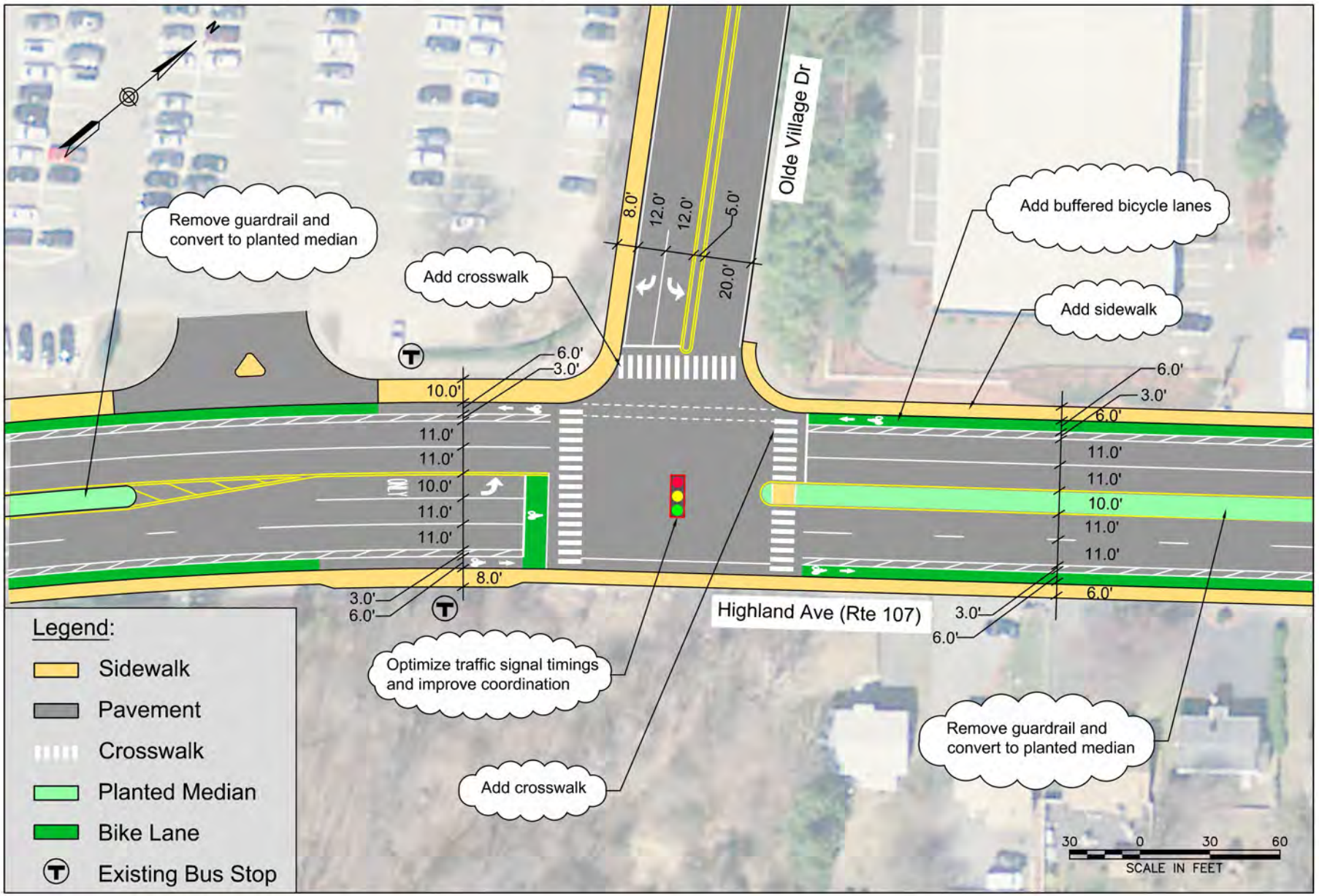

ROUTE 107 Lynn Salem Corridor Study

Figure VI-14
Highland Avenue (Route 107) at Olde Village Drive
Route 107 Corridor Study
Lynn/Salem, MA

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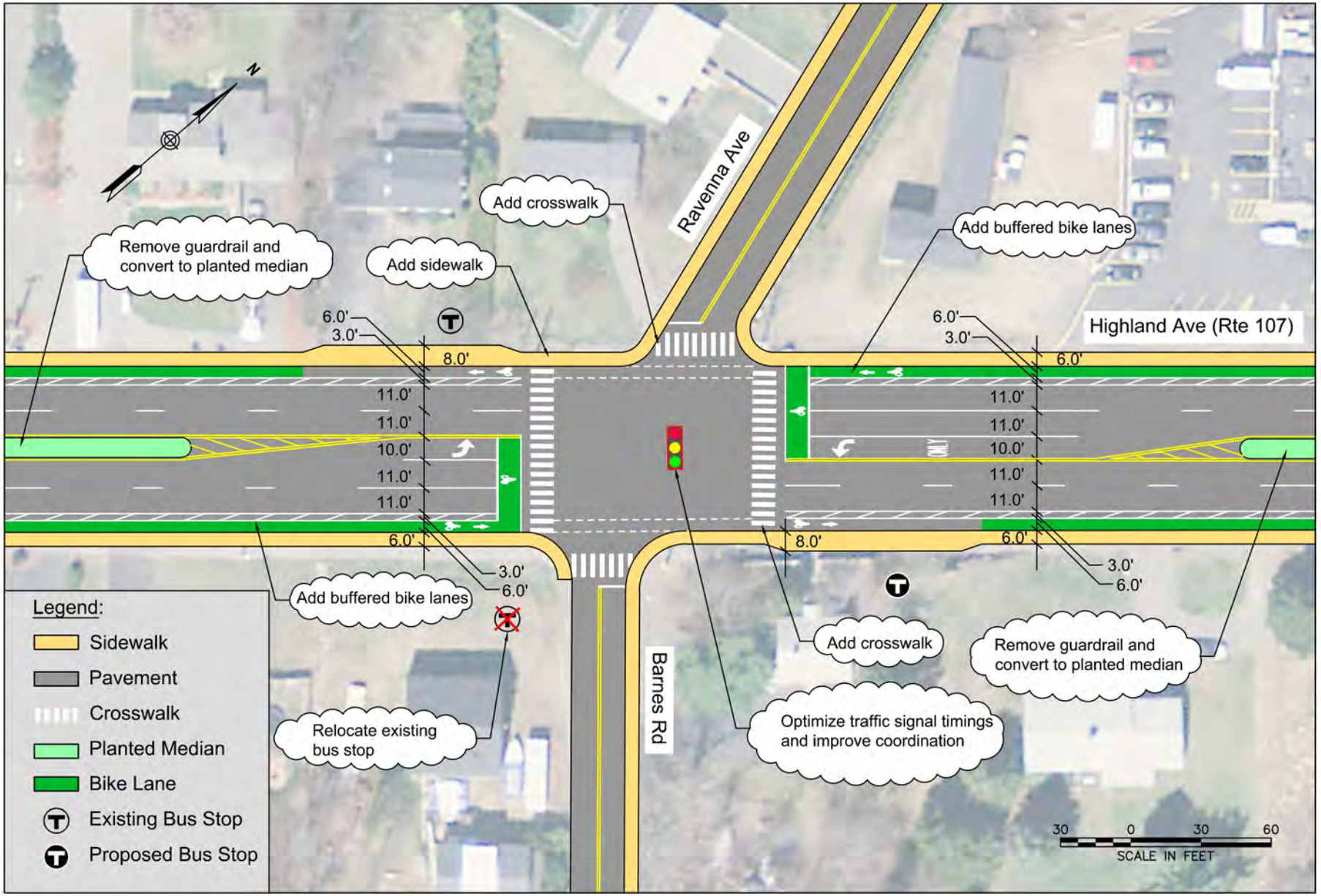

ROUTE 107 Lynn Salem Corridor Study

Figure VI-15
Highland Avenue (Route 107) at Barnes Road and Ravenna Avenue
Route 107 Corridor Study
Lynn/Salem, MA

Highland Avenue at Swampscott Road/Dipietro Avenue and Highland Avenue at Marlborough Road/Traders Way (Zig zag) (see Figure VI-16 through Figure VI-17)

The proposed roadway improvements to the Highland Avenue at Swampscott Road/Dipietro Avenue intersection, and the Highland Avenue at Marlborough Road/Traders Way intersection (Zig zag) are limited due to several constraints including the proximity of Thomas Circle, ledge, walls, parking areas, elevation difference with abutting properties, and the existing alignment of Dipietro Avenue. The existing roadway width is approximately 70 feet. There is no sidewalk on the western side of the road and a 10-foot wide cement concrete sidewalk on the east side. Due to the extensive roadside constraints, the proposed cross-section width is essentially limited to the existing roadway width. Therefore, the proposed cross-section on Highland Avenue consists of four 11-foot travel lanes, one 11 foot left turn lane, five foot bicycle lanes in both directions, a two foot center median, and two sets of two foot wide lane barrier between the two through lanes. The proposed improvements incorporate a minimum six foot wide sidewalk on the western side of the road and retain the 10 foot wide sidewalk on the eastern side of the road. Other improvements include adding a crosswalk across Route 107, connecting the crosswalk on Swampscott Road to Route 107, optimizing traffic signal timings and improving signal coordination.

The intersection of Highland Avenue at Marlborough Road/Traders Way is expected to operate at overall LOS E under the 2035 Build condition during the weekday morning, weekday afternoon, and Saturday midday peak hours. Geometric and signalization changes to the intersection reduce the amount of queuing along Route 107 between the 2035 No Build and 2035 Build conditions. The intersection of Highland Avenue at Swampscott Road/Dipietro Avenue is shown to operate at overall LOS C or better under the 2035 Build condition during the weekday morning, weekday afternoon, and Saturday midday peak hours. All operations at the intersection operate at LOS E or better and well under capacity. Queuing is expected to be reduced from the 2035 No Build and 2035 Build conditions. The Route 107 southbound left turn queue is reduced significantly and eliminates the spillover that currently exists when the left turn lane storage is exceeded.

For Highland Avenue at Marlborough Road/Traders Way, the alignment of Marlborough Road/Traders Way would be slightly realigned toward the north. The realignment provides ample space for the four lanes on Marlborough Road, and provides a better alignment for the through movements between Marlborough Road and Traders Way. The realignment requires right-of-way acquisition, however the majority of the property is a landscaped area in front of the CVS Pharmacy. Lane barriers would be added on Highland Avenue to prevent the zig zag movement. At the intersection, Highland Avenue would consist of six 11-foot travel lanes (two through lanes in each direction, opposing left turn lanes, and northbound and southbound right turn lanes), a two-foot median, two two-foot lane barriers, five-foot bicycle lanes, a six-foot wide sidewalk on the west side, and an eight-foot sidewalk on the east side. On Traders Way, improvements include adding a second receiving lane eastbound, and removing the channelized right turn lane and raised island. On Marlborough Road, a left turn lane was added.

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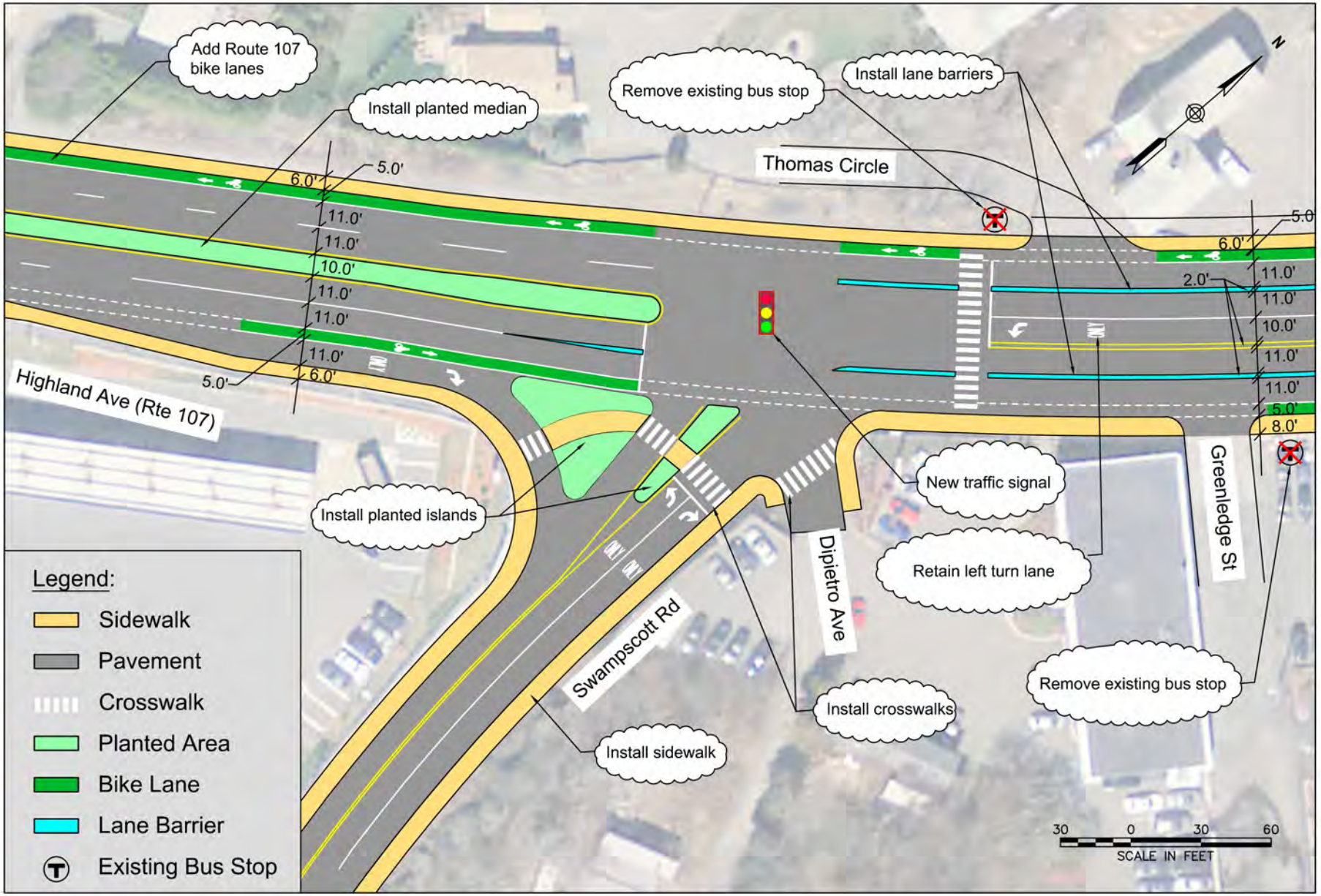

ROUTE 107 Lynn Salem Corridor Study

Figure VI-16
Highland Ave (Route 107) at Swampscott Road
Route 107 Corridor Study
Lynn/Salem, MA

For the Swampscott Road and First Street intersection, minor strip acquisition and access management would be required for the proposed intersection improvements. On Swampscott Road, the existing width is approximately 42 feet including the sidewalk on the east side. There is not an existing sidewalk on the west side of the roadway. The proposed cross-section at the intersection includes two 11-foot lanes on the northern side (one through lane northbound and one through/left turn lane southbound) and four 11-foot lanes on the southern side (two through lanes southbound, one through and one right turn lane northbound) and an eight-foot wide sidewalk on the east side of the roadway. On First Street, the existing curb to curb width is approximately 40 feet. The proposed cross-section at the intersection consists of three 11-foot lanes (one lane eastbound, and one left turn and one left/right turn lane westbound) and two eight-foot sidewalks. A new traffic signal would be added at this intersection. Other improvements include advance destination signage for navigation through the area and crosswalks to be added on the First Street and Swampscott Road northbound leg.

At First Street and Traders Way, the improvements include optimization of traffic signal timings and providing curb ramps to meet current standards. In addition, consideration should be given to providing a free-right turn with a larger radius from Traders Way onto First Street to better accommodate the traffic.

If this alternative is studied further, re-alignment of the First Street and Swampscott Road intersection to establish Swampscott Road and First Street as the through movement as shown in Figure V-47 (in Chapter V) should be further evaluated. Traffic impacts to First Street under this condition should be modeled to examine potential impacts that may result.

Transit improvements include the relocation of the Marlborough Road inbound stop to the far side of the intersection, out of the right turn only lane, to remove the conflict with the proposed bicycle lane, and in conjunction with access management and construction of a sidewalk on the west side of Route 107. The proposed lane barrier on the far side of the intersection would not enable vehicles to overtake a bus stopped at the stop, however the delay to general traffic is anticipated to be minimal given the relatively low ridership and low frequency of service on routes serving this stop. Opportunities to relocate or add new amenities at this stop should be pursued. Given the proximity of this relocated stop to the next stop at Thomas Circle, and the low ridership and narrow sidewalk, this inbound stop is proposed for removal.

For the outbound bus stops, Greenledge Street is proposed for removal, in conjunction with the removal of its existing inbound stop pair at Thomas Circle, and because of the proposed establishment of a new outbound stop far side of Traders Way. The new stop is proposed to create a stop closer to rider origins/destinations at the adjacent Shaw's and other retail stores, and create a missing stop pair for the existing inbound Marlborough Street stop.

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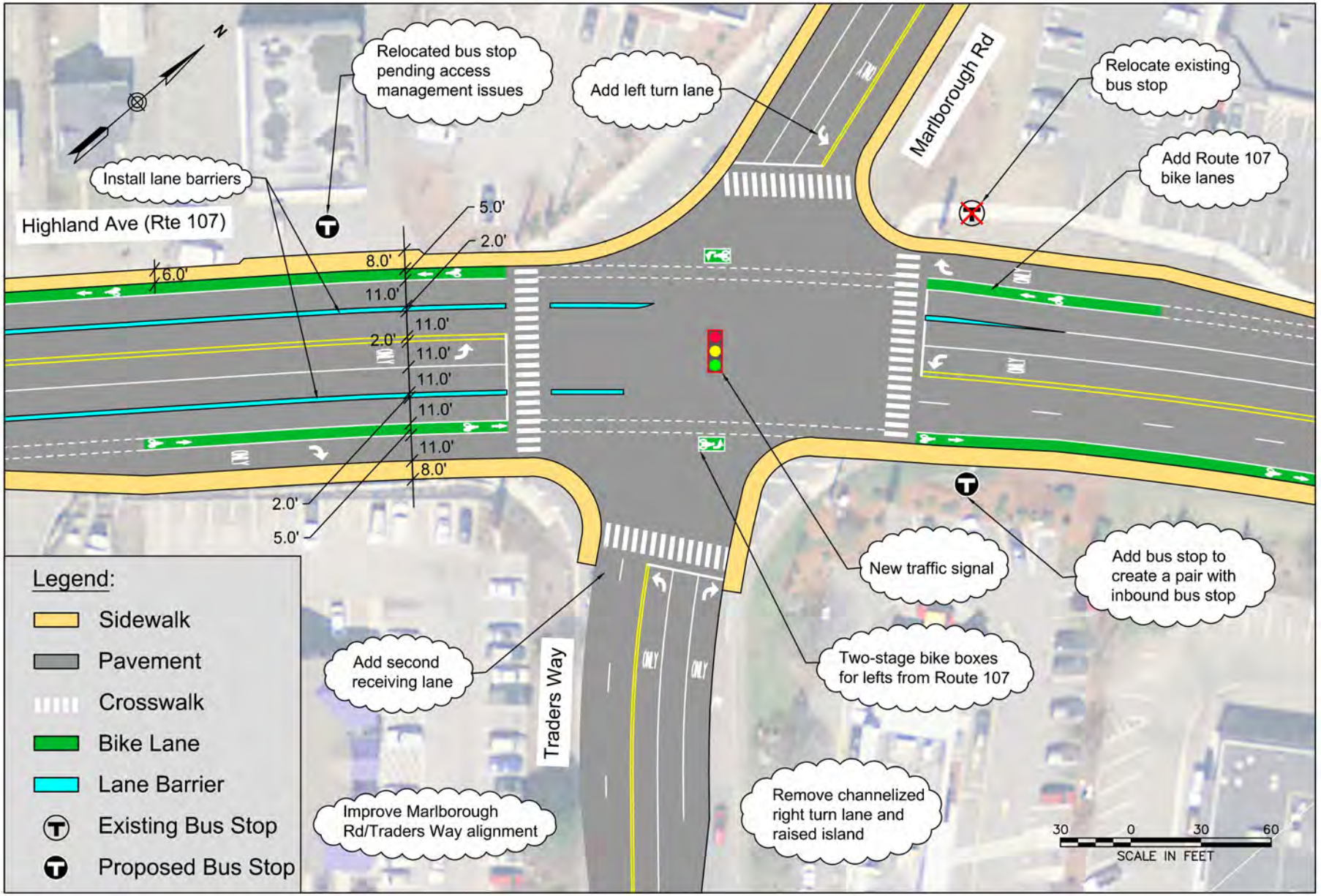

ROUTE 107 Lynn Salem Corridor Study

Figure VI-17
Highland Avenue (Route 107) at Marlborough Road
Route 107 Corridor Study
Lynn/Salem, MA

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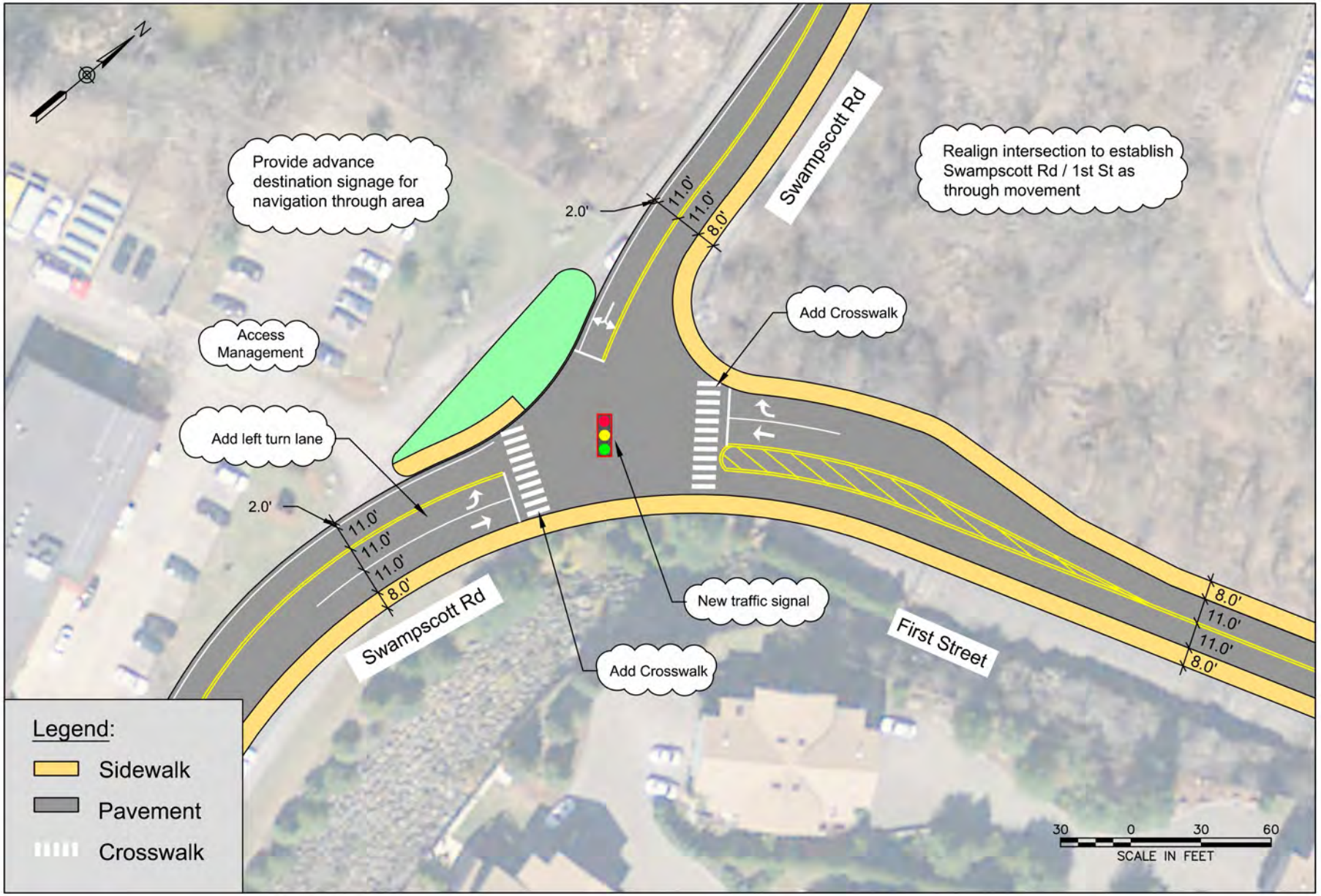

ROUTE 107 Lynn Salem Corridor Study

Figure VI-18
Swampscott Road at First Street
Route 107 Corridor Study
Lynn/Salem, MA

Highland Avenue at Hawthorne Square Mall Shopping Center (see Figure VI-19)

Proposed improvements at this location include the following:

Remove exclusive right turn lane on southbound Route 107 and establish through/right lane. Improve channelization at the Dunkin Donuts/Pep Boys approach to the intersection. Optimize the traffic signal timings and improve signal coordination.

The intersection is expected to operate at overall LOS D or better under the 2035 Build condition during the weekday morning, weekday afternoon, and Saturday midday peak hours. Improvements in the coordination between Hawthorne Square Mall and the zig zag intersections prevent the queues in the northbound direction from extending back to the Marlborough Road intersection.

Remove the guardrail and convert the existing paved median to a planted median. Improve/provide crosswalks and extend the planted median through the crosswalk so it provides a refuge for pedestrians. Improve crosswalks and pedestrian facilities in accordance with ADA, and introduce protected buffered bicycle lanes with bicycle boxes at the intersection.

For transit, retain the existing inbound stop nearside, and shift the outbound stop closer to the intersection to a wider section of the sidewalk for improved pedestrian connections to the retail area.

Highland Avenue Study Area Lane Drop Transition (see Figure VI-20).

Improvements at the study area transition from the four-lane roadway to the three-lane roadway include the following:

Remove the guardrail and convert the existing paved median to a planted median. Improve pedestrian facilities in accordance with ADA, and transition protected buffered bicycle lanes to unprotected bicycle lanes.

For transit, at the transition section near Freeman Road, the inbound and outbound stops at the Freeman Road intersection are proposed for removal in the short-term. The inbound stop east of Crowdis Street and the pedestrian bridge is to be retained. Consider adding a crosswalk behind this stop, and relocating the outbound stop opposite Valley Street to the far side of this crosswalk, to improve pedestrian connections to the bridge and stop spacing with the removal of the Freeman Road stops.

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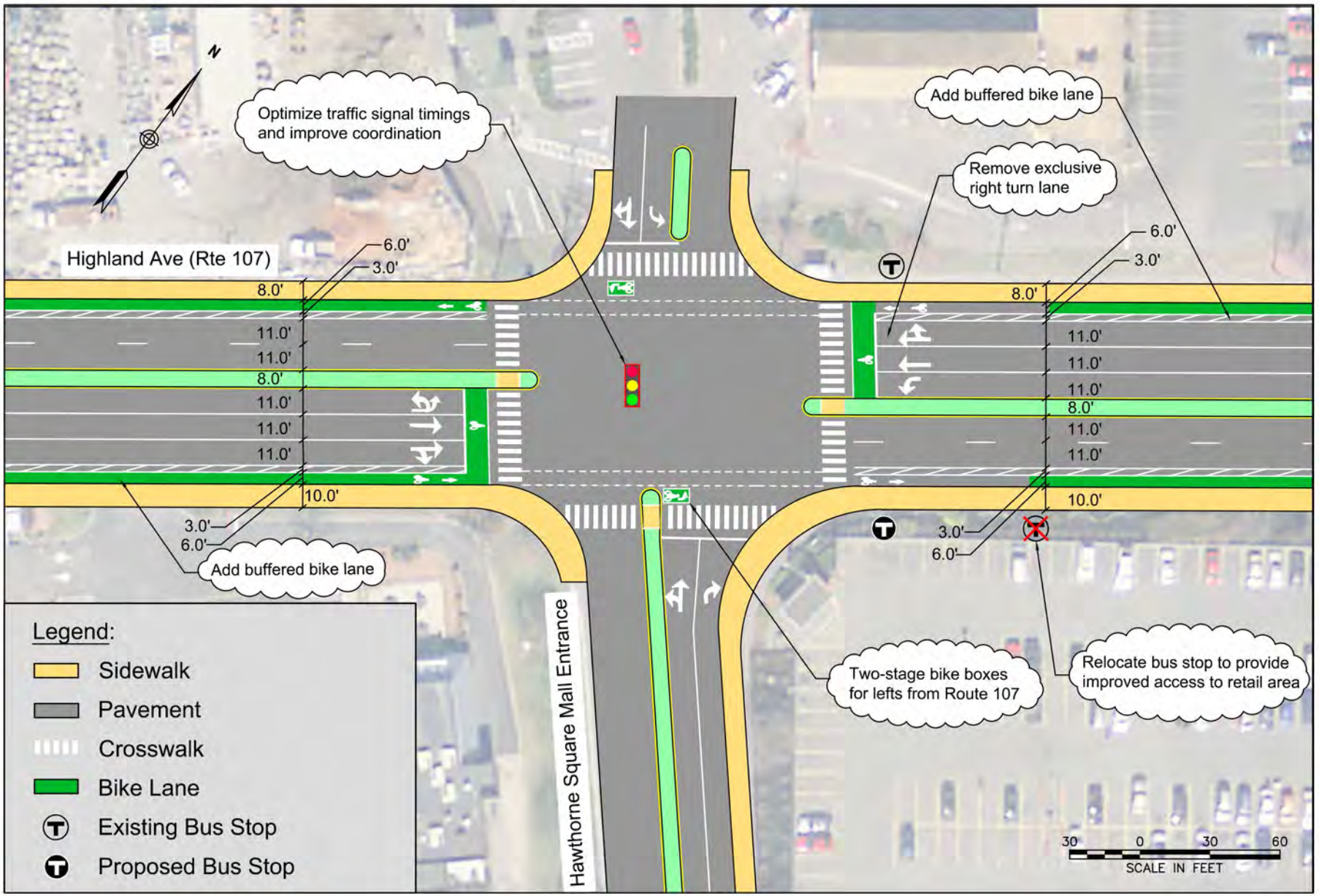

ROUTE 107 Lynn Salem Corridor Study

Figure VI-19
Highland Avenue (Route 107) at Hawthorne Square Mall
Route 107 Corridor Study
Lynn/Salem, MA

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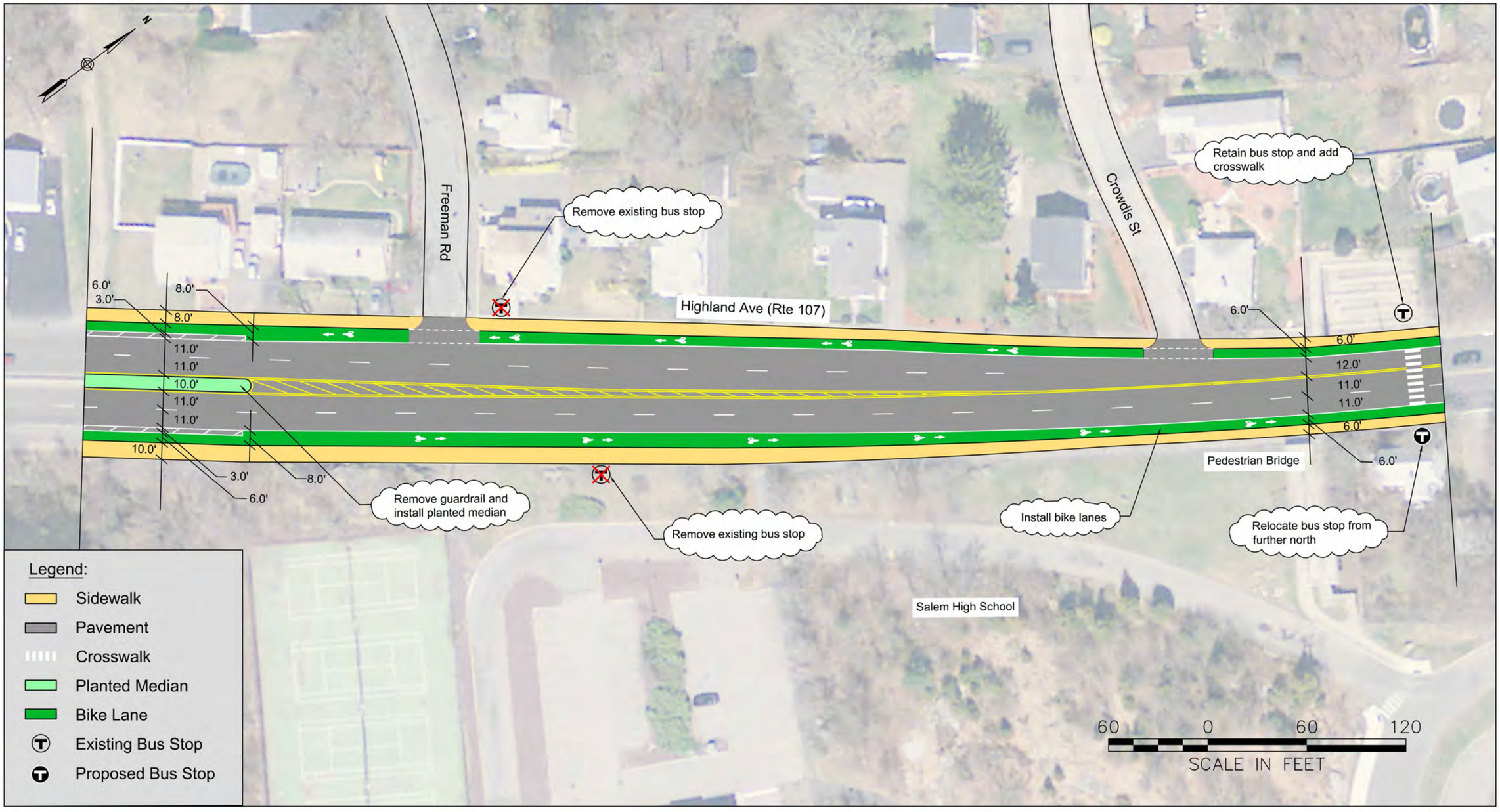

ROUTE 107 Lynn Salem Corridor Study

Figure VI-20
Highland Avenue (Route 107) Corridor Transition 2
Route 107 Corridor Study
Lynn/Salem, MA

Highland Avenue at Willson Street and Cherry Hill Avenue (see Figure VI-21)

Proposed improvements at this location include the following:

Recommendations for the northbound approach are to provide a through lane and a right turn only lane. On the southbound approach, a through/left turn lane and a through lane are recommended. Two receiving lanes on Route 107 south of the intersection are necessary to handle the Route 107 south through traffic and the Willson Street left turning traffic. Improvements to the traffic signal timings and coordination are recommended.

The intersection is expected to operate at overall LOS D during the weekday afternoon and Saturday midday peak hours and LOS E during the weekday morning peak hour under the 2035 Build condition. Queuing is expected to increase along Route 107 due to the changes at the intersection; however, it is not expected to impact the surrounding intersections.

The proposed plan includes improved crosswalks and pedestrian facilities in accordance with ADA and the introduction of bicycle lanes with a southbound bicycle box at the intersection. Sharrows are recommended on Route 107 for the short two lane section southbound just south of the intersection, since a full bicycle lane is not feasible at this location. The Working Group suggested that use of the adjacent high school property be considered for bicycle accommodations. One option is depicted in Figure VI-22, where the northbound bicycle lane is taken off road beginning just south of the pedestrian bridge and transformed into a multiuse path. The path maneuvers through the City owned property abutting the high school driveway and reconnects to Willson Street. This would allow the Route 107 southbound bicycle lane to continue through this intersection. This concept should be explored in more detail as the project progresses into the next phase.

Transit improvements include retaining the inbound stop nearside, due to the proximity of the schools, considering a shifting of the stop slightly to the north if sight distance is an issue for drivers, and widening the sidewalk to provide a landing area. The outbound stop should also be retained at its new far side location (assumed to have been relocated in the short-term) and improvements made to the existing sidewalk.

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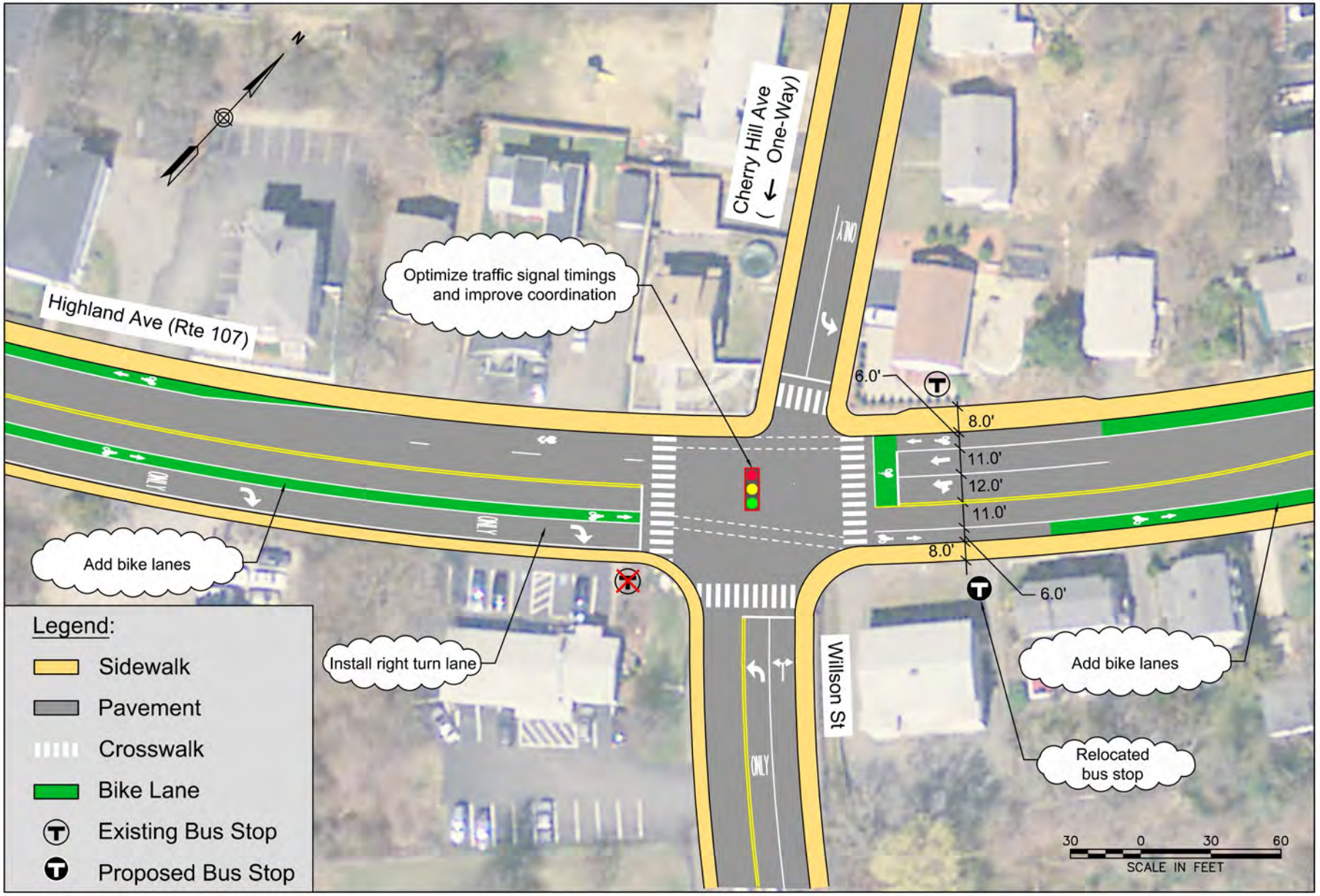

ROUTE 107 Lynn Salem
Corridor Study

Figure VI-21
Highland Avenue (Route 107) at Willson Street and Cherry Hill Avenue
Route 107 Corridor Study
Lynn/Salem, MA

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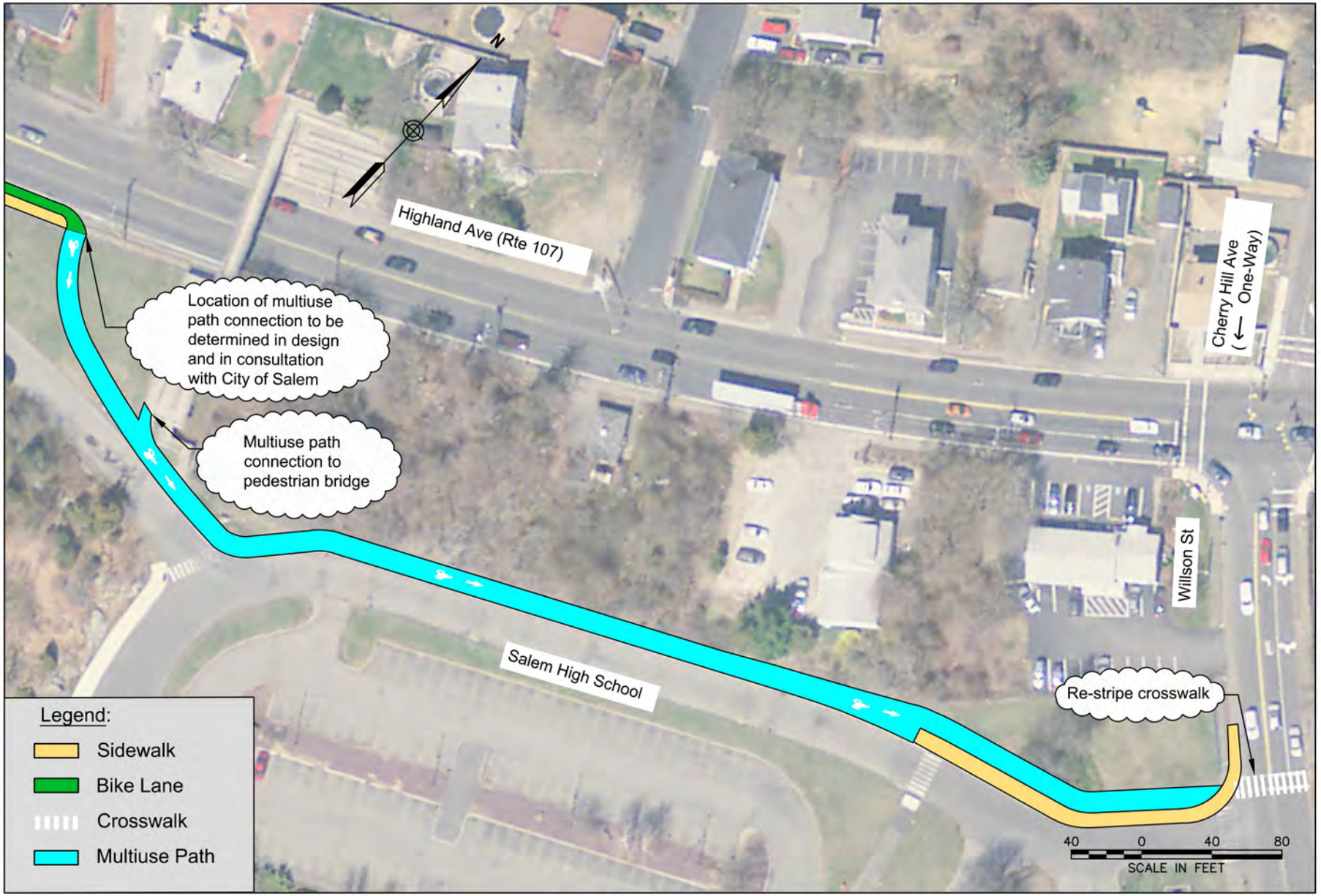

ROUTE 107 Lynn Salem Corridor Study

Figure VI-22
Western Avenue (Route 107) at Willson Street and Cherry Hill Avenue
Route 107 Corridor Study
Lynn/Salem, MA

Highland Avenue at Salem Hospital Lower Driveway (see Figure VI-23)

Proposed improvements at this location include the following:

A new traffic signal is recommended at this intersection, with a new left turn lane on Route 107 southbound.

The installation of the traffic signal at the Salem Hospital Lower Driveway improves the level-of-service for the hospital entrance approach from LOS E and LOS F under the 2035 No Build condition to LOS D or better under the 2035 Build condition during the three identified peak hours. With the addition of the traffic signal and the southbound left turn lane, the intersection approaches on Route 107 still operate at LOS B or better. Queues along Route 107 due to the installation of the signal are not expected to impact the surrounding intersections.

The intersection is expected to operate at overall LOS B or better under the 2035 Build condition during the weekday morning, weekday afternoon, and Saturday midday peak hours.

Reconstruction of the existing sidewalks in accordance with ADA guidelines is recommended as well as the installation of bicycle lanes with a southbound bicycle box. Added crosswalks and improvements to the existing crosswalks are recommended to enhance pedestrian facilities.

For transit, retain the inbound stop nearside of Proctor Street and far side of the crosswalk, and widen the sidewalk to provide a landing area. At the outbound stop, opposite Procter Street, retain the far side stop, in conjunction with sidewalk and crosswalk improvements at the intersection.

Highland Avenue/Essex Street at Jackson Street and Dalton Parkway (see Figure VI-24)

Proposed improvements at this location include the following:

Traffic signal timings and coordination improvements are recommended.

The intersection is expected to operate at overall LOS C or better under the 2035 Build condition during the weekday morning, weekday afternoon, and Saturday midday peak hours.

To better manage the turn restrictions and to better define the two adjacent minor street approaches, island modifications are recommended including the extension of the large island between Jackson Street and Dalton Parkway toward Route 107 and into the crosswalk to provide pedestrian refuge and reduce intersection size. Pavement striping and signage improvements are proposed to better define lane assignments. Improve crosswalks and pedestrian facilities in accordance with ADA, and introduce bicycle lanes with bicycle boxes at the intersection. North of the intersection, reintroduce protected buffered bicycle lanes.

No transit improvements in this section of the study area.

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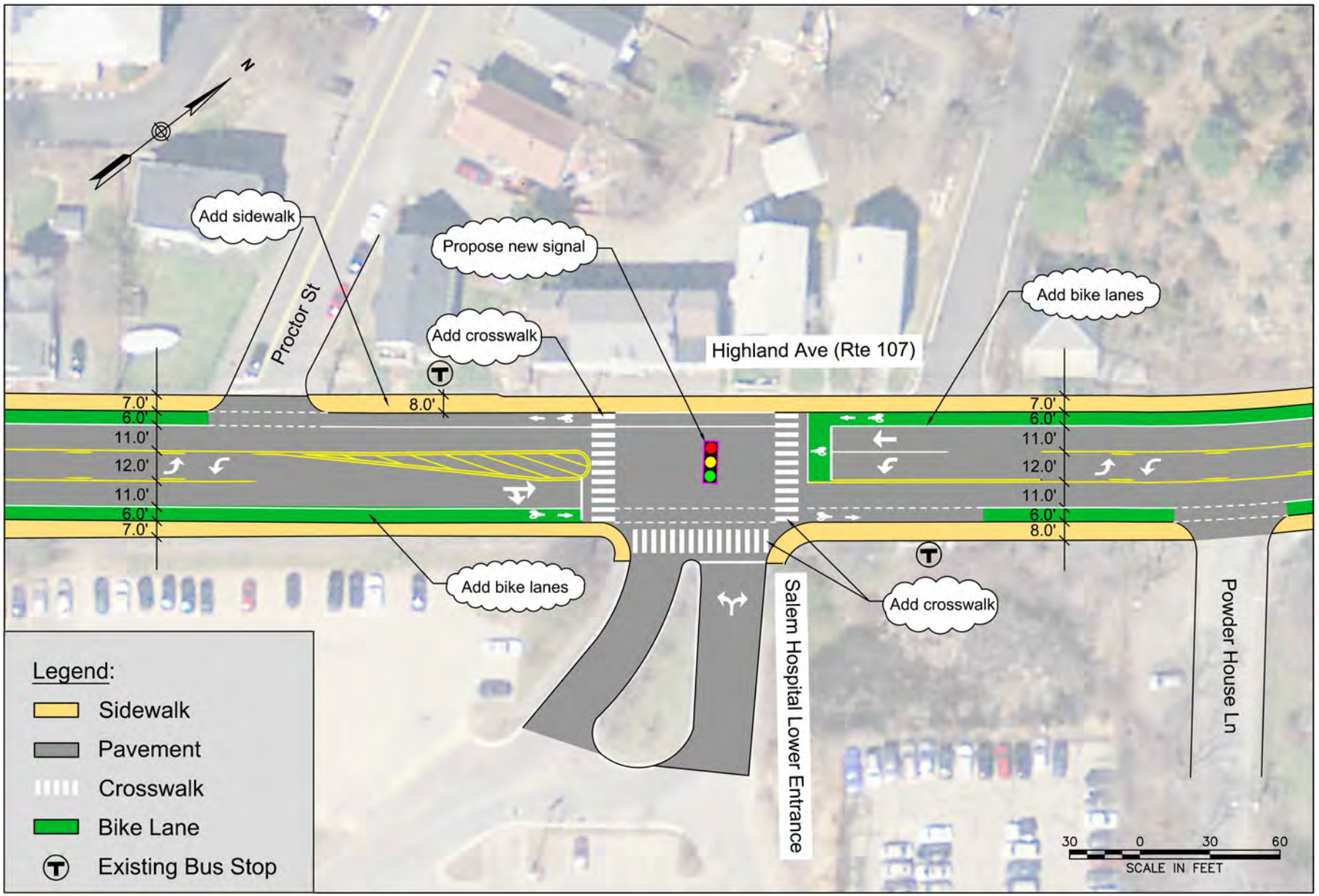

ROUTE 107 Lynn Salem Corridor Study

Figure VI-23
Highland Avenue (Route 107) at Salem Hospital Lower Entrance
Route 107 Corridor Study
Lynn/Salem, MA

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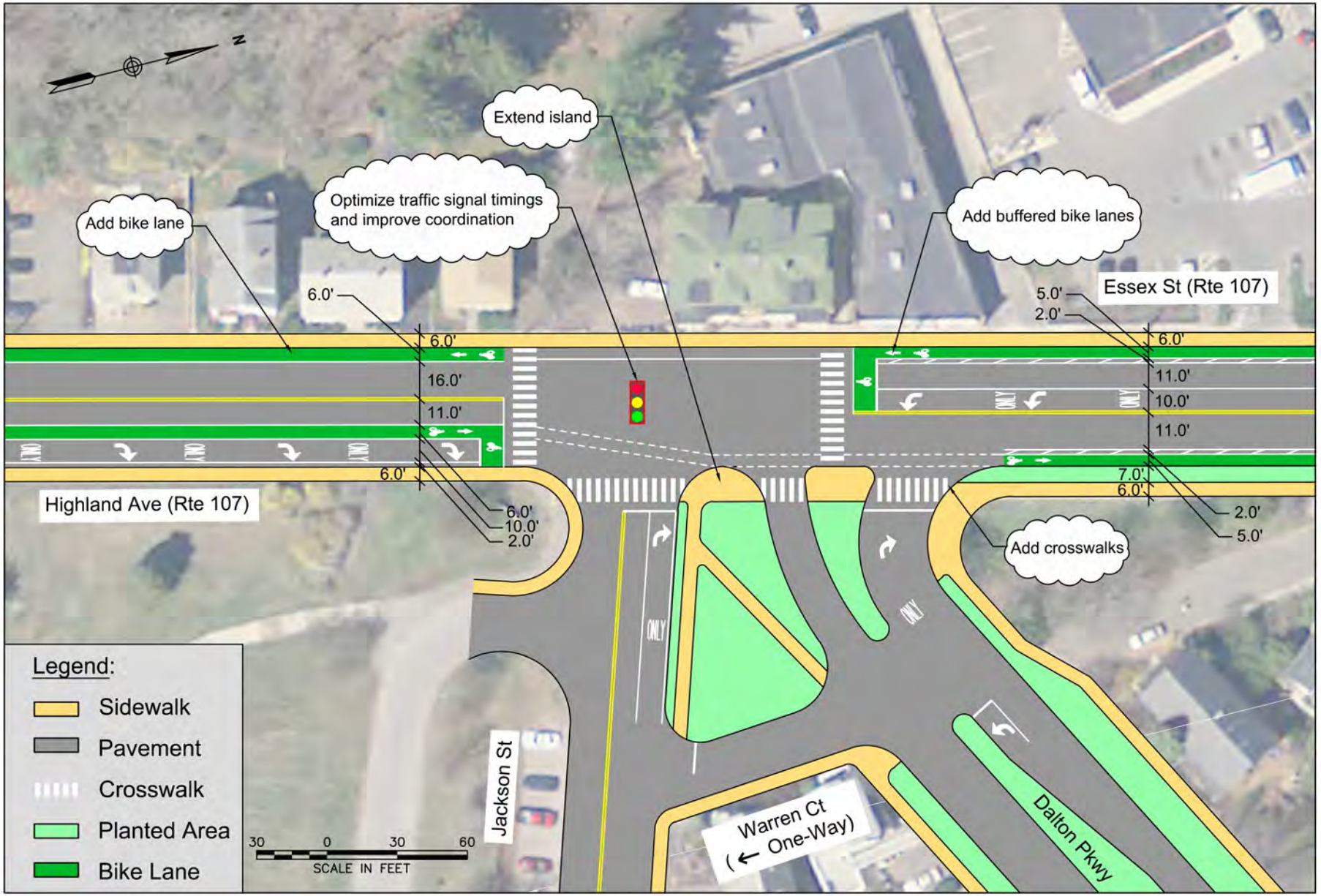

ROUTE 107 Lynn Salem Corridor Study

Figure VI-24
Route 107 at Jackson Street and Dalton Parkway
Route 107 Corridor Study
Lynn/Salem, MA

Essex Street at Boston Street (see Figure VI-25)

Proposed improvements at this location include the following:

Due to the predominant traffic stream flowing between Route 107 to the south and Route 107 to the west, realignment of the intersection to establish Essex to Boston (Route 107) as the through movement is recommended.

Within the newly created public areas resulting from the realigned intersection, a “shared street” for local vehicular property access, bicycles, and pedestrians is recommended. The shared space can serve the driveways at this intersection, offer space for pedestrian and bicyclists to converge, and provide an area for landscaping and/or the relocated monument. The shared street space is proposed to be constructed of a different material or texture, so that it is obvious that this space is different from a travel way. Shared street spaces can serve for recreation and socializing, providing added benefit to pedestrians, while still allowing for the unloading/loading necessities of vehicular traffic in a commercial area. The idea behind the concept is create new open space and a plaza-style environment created by realignment of the intersection. Due to the driveways at the intersection a “shared street” would allow for continued access to businesses at this intersection. Entry and egress through the driveways by motorists would need to be made obvious by markings in the pavement of the road or within the different material or texture of the new space itself, signage, and orientation of the space itself. A decision to implement the “shared street” space would be the choice of the City of Salem, and orientation of the space itself determined in the design phase.

On the Essex Street southbound approach, a left turn only lane and a right turn only lane are proposed. A through lane and a right turn only lane are proposed on the Boston Street westbound approach. For the northbound approach, a through lane and a right turn only lane are proposed.

The traffic signal timings and phasing would be modified to better serve the proposed lane arrangements and signal coordination is to be improved. Special pavement markings would be provided at the fire station driveway to alert motorists that driveway access is to be maintained.

Pedestrian improvements proposed include the improvement and addition of crosswalks and pedestrian facilities in accordance with ADA. The protected buffered bicycle lanes along Route 107 terminate prior to the intersection and at the point where the shared street begins.

Given the proposed alignment and signal timing adjustments, the intersection is expected to operate at overall LOS C or better under the 2035 Build condition during the weekday morning, weekday afternoon, and Saturday midday peak hours. The realignment of Route 107 as the through movement reduces queueing along the mainline thus preventing spillback to the intersection of Highland Avenue and Jackson Street/Dalton Parkway.

No transit improvements are proposed at this location.

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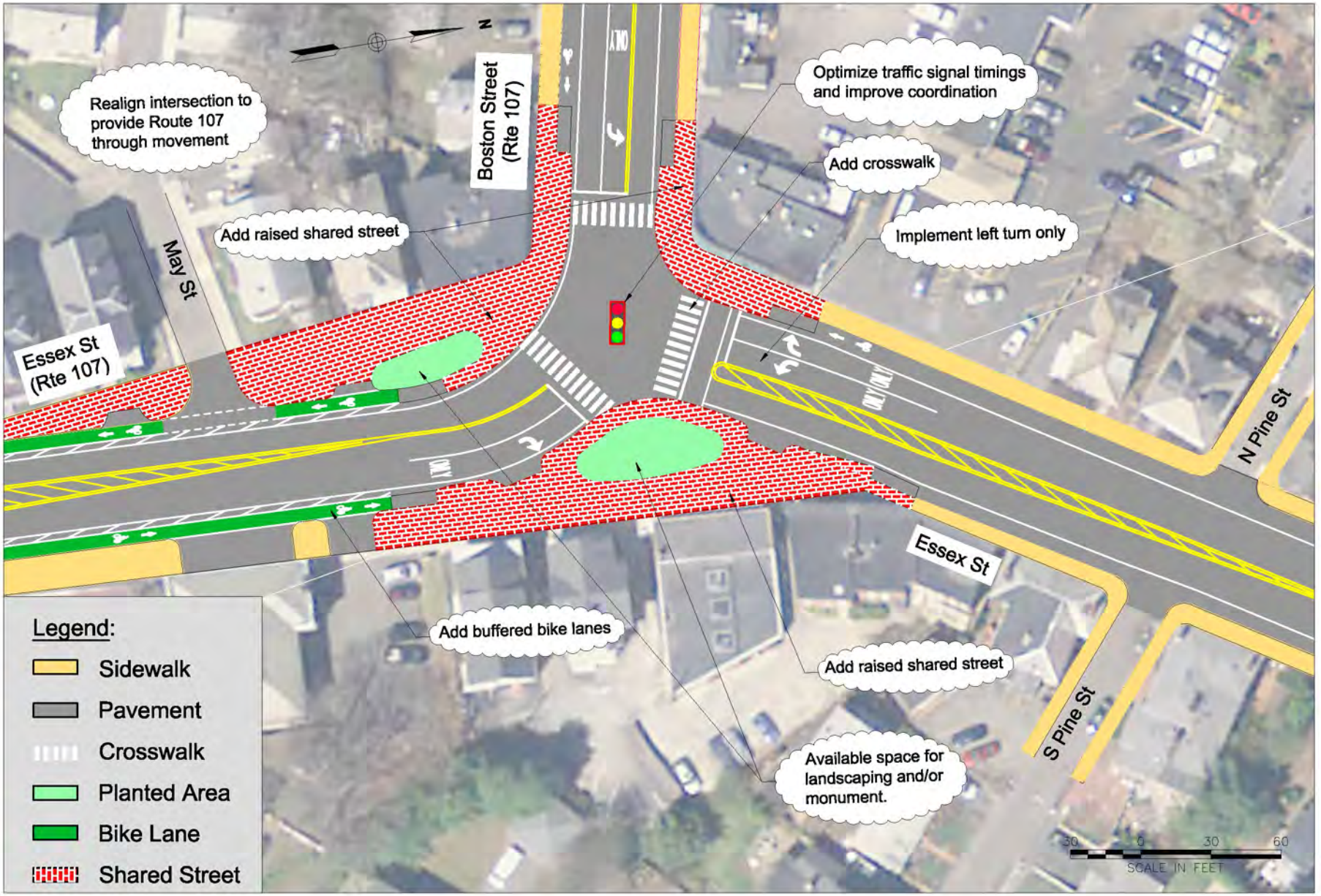


ROUTE 107 Lynn Salem Corridor Study

Figure VI-25
Essex Street (Route 107) at Boston Street
Route 107 Corridor Study
Lynn/Salem, MA

Short Term Improvements

The study area offers limited opportunity to provide short-term improvements since a majority of the recommendations involve major infrastructure changes. A number of the improvements produce a positive effect when implemented in conjunction with study area wide improvements and improvements at adjacent intersections as well. However, some short term improvements can be made to improve safety and operations at the study area intersections along the Route 107 study area. The level-of-service for the Route 107 intersections with the short term improvements in place is included in the LOS summary provided in the Appendix.

Adjustments can be made to the current signal timings to reduce vehicular delay and queuing along the study area. It was discovered that by optimizing and shortening cycle lengths at a majority of the intersections, the movement delay and queuing would decrease. Updates to the minimum split times can also be made to make the signal operate more efficiently and provide more green time to the critical intersection movements. Updates to the existing coordination for adjacent intersections can improve operations along the Route 107 mainline, specifically at the zig zag intersections where large delay and queue spillback was identified to be a problem.

Focusing more specifically on the individual intersections, short term improvements were identified at multiple locations along the study area. In order to provide more effective exclusive left turn lanes, the southbound left turn at Highland Avenue and Marlborough Road/Traders Way and the northbound left at Highland Avenue and Hawthorne Square Mall Shopping Center can be updated from leading to lagging left turns. Another short term improvement to reduce queue spillback between the signalized intersections would be to coordinate Highland Avenue at Jackson Street/Dalton Parkway and Boston Street at Essex Street. To address high crash rates, implementation of the recommended turn lanes on Route 107 at the intersections of Chestnut Street and Chatham Street in Lynn should be considered in the near term.

Short-term improvements for pedestrians and bicyclists are somewhat limited. Cleaning the sidewalks and shoulder areas would help conditions. Implementing recommended crosswalks that do not require signalization could be completed in the short term. In the retail segment, the wide should area could be restriped as a bicycle lane. However, the bicycle amenity would only exist for a short distance.

Transit provides the most opportunity for short term improvements. Route 456 presents an opportunity to improve bus service along the study area. The route has remained unchanged since 2002. The following aspects of the Route 456 service are recommended for review and further investigation as follows:

- Expand Route 456's use as a commuting option to/from Salem Hospital, especially with the closure of Union Hospital in Lynn, which would likely result in more people in the area traveling to Salem Hospital. The service also has the potential to better serve workers commuting to the Hawthorne Square Mall Shopping Center.

- Provide better connections between Downtown Lynn and Salem and retail centers along Route 107. Connecting these economic centers can help unite the study area and provide a better sense of place.
- Improve overall transit service. Comments received from the public survey support the need for increased bus service overall along the study area, including faster speeds, more frequent service, and longer hours of operation.

Further study of Route 456 by the MBTA could potentially be integrated into their quarterly schedule reviews, or their biennial Service Plan.

Select bus stop changes from the proposed Bus Stop Optimization Plan, could be implemented in the short-term, following consultation with the MBTA and identification of the local municipal approval process for bus stop changes. A determination would need to be made on whether the number and extent of the proposed changes are significant to warrant a separate public process, or if they could be implemented as soon as MBTA resources are available to remove bus stop signs and update internal tracking systems. The MBTA may also consider relocating some stops temporarily to better existing locations, while funding opportunities, for the design and construction at bus stops to meet MBTA and ADA requirements, is pursued. Temporary relocations for short-term improvements were noted in the optimization plan previously summarized in Table V.1 and depicted in Figure V-1 and Figure V-2 (in Chapter V), and are described below.

Bus stops within the study area are proposed for removal for one or more of the following reasons:

- low ridership
- absence of an existing crosswalk
- missing curb ramps at the adjacent intersection
- narrow sidewalk
- poor sidewalk conditions, including a grass strip within the landing area
- poor safety of riders isolated between very active driveways
- proximity of non-trip generating uses (e.g. water bodies, heavily wooded areas, etc.)
- close proximity to the previous and/or next bus stop

The early implementation of the following stop removals would help to speed up service in the short-term. Bus stops on either side of those proposed for removal are proposed to be retained, although their location may need to adjust slightly (for example a stop may move from one side of the intersection to the other side, or shift about 200 feet) in the short and or long-term. On-street parking spaces may be added by the municipality in some locations once the bus stop has been removed. Refer to Figures 5.1 and 5.2 for the bus stop modification plan and the bus stop location plan, accordingly. Seven bus stop pairs (seven stops in each direction), and one single bus stop, for a total of 15 bus stops, are proposed for removal as follows:

Inbound stops:

1. Highland Avenue at Almeda Street
2. Highland Avenue at Freeman Road
3. Highland Avenue opposite Cedar Road
4. Western Avenue opposite Victory Road
5. Western Avenue opposite Eastern Avenue
6. Western Avenue at Brooklawn Terrace
7. Western Avenue opposite Tracy Avenue

Outbound stops:

1. Western Avenue at Tracy Avenue
2. Western Avenue at Lloyd Terrace
3. Western Avenue at Eastern Avenue
4. Western Avenue at Victory Road
5. Highland Avenue at Cedar Road
6. Highland Avenue opposite Freeman Road
7. Highland Avenue at Almeda Street
8. Highland Avenue opposite 30 Highland Avenue

The following stops should be considered for temporary relocation due to accessibility deficiencies, safety and/or visibility issues at the existing stop, many of which were specifically highlighted in the deficiencies chapter of the report. Some stops could be restored to their original location, following sidewalk and other improvements as part of the long-term recommendations. ADA accessibility at the proposed locations has not been determined as part of this study. No parking impacts were determined to be associated with these proposed changes. Other recommendations included in this list are improvements to the accuracy of the bus stop descriptions.

Inbound stops:

1. Highland Avenue opposite Salem Hospital. Rename the stop description to Highland Avenue opposite Salem Hospital (not “at” Salem Hospital) to reflect the location of the hospital relative to the stop. Consider adding “Upper Entrance” to the stop description to distinguish between the upper and lower entrances to the hospital, where the lower entrance is located at Proctor Street.
2. Highland Avenue at Thomas Circle. Temporarily retain this stop, pending future sidewalk construction, as part of future corridor and intersection improvements, and improve visibility of the stop by relocating the front sign.
3. Highland Avenue at Ravenna Avenue. The existing stop is located far side of the intersection but there is no sidewalk and there are a number of pinch points because of the mast arm post and pedestrian signal post. Temporarily relocate the stop to the nearside of the intersection where a sidewalk is currently provided and pending

sidewalk construction at the existing location, as part of future intersection improvements.

4. Western Avenue opposite Buchanan Circle. Relocate the stop about 270 feet south to the far side of the crosswalk to improve pedestrian connections and safety. Rename the stop description to Western Avenue at Bellaire Avenue to reflect the side street adjacent to the stop.
5. Western Avenue at Fays Avenue. Relocate the front sign from the pedestrian signal at back of sidewalk onto its own post at the face of the sidewalk, to improve visibility of the stop.
6. Western Avenue at (North) Maple Street. Rename the stop description to Western Avenue at Maple Street (no "north") to reflect the side street adjacent to the stop.

Outbound stops:

1. Western Avenue opposite Fays Avenue. The rear door of the bus currently opens to a driveway. Shift the stop further south towards the Fays Avenue intersection to enable both doors to open to a level sidewalk. Rename the stop description to Western Avenue opposite (not "at") Fays Avenue to reflect the absence of a side street at this stop.
2. Western Avenue at Buchanan Circle. The existing stop and front sign is located behind a guard rail. Relocate the front sign onto its own post, about 40 feet north of its current location.
3. Highland Avenue at Wyman Avenue. This stop was planned for deactivation by the MBTA in Fall 2015 due to safety concerns. Verify the bus stop signs were removed.
4. Highland Avenue opposite Walmart. The existing midblock stop is located at a narrow sidewalk, and a utility pole in the middle of the sidewalk creates a major barrier between the bus stop and the pedestrian crossing. Temporarily relocate the stop to the far side of the crosswalk pending sidewalk widening at the existing location, as part of future intersection improvements.
5. Highland Avenue at Greenledge Street (see Image VI.6).The existing far side stop is located on a sidewalk with no curb reveal and no barrier to divide the sidewalk and parked cars from the abutting auto dealership, which indicates the sidewalk may actually be a driveway. Temporarily relocate the stop to the nearside of Greenledge Street for a better existing sidewalk and a more pleasant and safe waiting area, and pending sidewalk construction on the west side of Route 107, as part of future intersection improvements. Rename the stop description to

Image VI.6: Poor sidewalk conditions on Highland Avenue at Greenledge Street.

Highland Avenue at Greenledge Street (not Greenledge "Road") to reflect the side street adjacent to the stop.

6. Highland Avenue at Wilson Street. The existing nearside stop is located in a wide driveway. Relocate the stop to the sidewalk on the far side of the intersection, after the crosswalk.
7. Highland Avenue at Salem Hospital. Consider adding "Upper Entrance" to the stop description to distinguish between the upper and lower entrances to the hospital, where the lower entrance is located opposite Procter Street.

It is assumed that other improvements require sidewalk construction, intersection improvements, and/or involve parking impacts and therefore would be considered longer term improvements.

Construction Costs

Preliminary construction costs were estimated for the proposed long-term improvements. The construction costs of the following items were estimated:

- Pavement
- Sidewalks
- Driveways
- Signals
- Curbing
- Temporary traffic control
- Drainage
- Contingencies

The construction costs include intersection improvements and roadway segment improvements. The costs are based upon MassDOT weighted average bid prices for 2015-2016. Design, right-of-way, and utility relocation costs are not included in these estimates.

The overall cost is estimated at approximately $26 million. The breakdown of these costs by the project segments is shown below:

- Lynn Study Area= $6,000,000
- Retail Study Area= $9,300,000
- Northern Study Arear= $5,000,000
- Zig zag Portion= $5,300,000

6. EVALUATION MATRIX

The evaluation matrix (see Table VI.1) below applies the evaluation criteria for each section of the Route 107 study area. The evaluation criteria, as detailed in Chapter I, were determined to be:

- Multimodal Mobility
- Safety
- Land Use and Economic Development
- Environmental Effects
- Community, Health, and Social Equity
- Constructability
- Cost

Within the evaluation matrix, each of the evaluation criteria is reviewed for the Lynn study area, the retail study area and the northern study area in order to show how the long-term recommendations meet the criteria. The short-term improvements achieve project goals similar to the long-term improvements, but to a lesser degree.

Table VI.1: Evaluation Matrix

Evaluation Category	Long-Term Recommendations		
	Lynn Study Area	***Retail Study Area***	***Northern Study Area***
	- Reduce lane width to 11’ - Add left turn lanes - Coordinate/optimize traffic signals - Add signal to Route 107/ Eastern Ave intersection - Add bicycle lanes - Consolidate bus stops - Provide ADA compliant bus stops - Replace sidewalks	- Reduce lane width to 11 - Add protected buffered bicycle lanes - Add sidewalk/crosswalks to west side of Route 107 - Coordinate/optimize traffic signals - Remove exclusive WB right-turn lane at Walmart & Hawthorne Square Mall - Consolidate bus stops - Provide ADA compliant bus stops	- Reduce lane width to 11’ - Add 12’ center turn lane - Install a signal at Salem Hospital entrance - Extend island & install crosswalks at Dalton Pkwy/Jackson St - Realign Route 107 intersection at Boston Street to provide Route 107 through movement. - Add bicycle lanes/protected buffered bicycle lanes

	- Access management	- Replace guardrail with landscaped median - Address zig zag movement on Route 107 connecting Swampscott Road to Marlborough Road through turn restrictions and re-routing movements onto First Street and Traders Way	- Consolidate bus stops - Provide ADA compliant bus stops - Replace sidewalks
Multimodal Mobility			
Reduce Traffic Congestion (LOS)	Signal timing adjustments and optimization at the southern study area intersections reduces the delay experienced by vehicles at the intersection. Introducing a signal at Eastern Avenue significantly reduces the delay experienced by vehicles accessing Route 107 from the minor streets.	Signal timing adjustments and optimization at the retail study area intersections reduces the delay experienced by vehicles. At the Marlborough-Swampscott zig zag, vehicle trips were redistributed through the First Street intersections so as to improve the operations along Route 107.	Signal timing adjustments and optimization reduces the delay experienced by vehicles at the northern study area intersections.
Cross-study area mobility	Exclusive left turn lanes at study intersections facilitate connections to crossing streets.	New intersection configurations and access controls improve the operations and reduce queuing at the Zig zag movement.	Realigning the Route 107 intersection at Boston Street to provide a Route 107 through movement improves the operations along Route 107 and prioritizes the Route 107 through movements.
Improve transit, bicycle and pedestrian modes	The consolidation of bus stops allows for more efficient transit travel within the study area. The amount of delay resulting from bus boarding/alighting and starting/stopping is reduced with fewer bus stops.	The consolidation of bus stops allows for more efficient transit travel within the study area. The amount of delay resulting from bus boarding/alighting and starting/stopping is	The consolidation of bus stops allows for more efficient transit travel within the study area. The amount of delay resulting from bus boarding/alighting and starting/stopping is reduced with fewer bus stops. Updating the existing bus stops to be

	Updating the existing bus stops to be ADA compliant also increases the accessibility of transit to all users. The reduction of lane width and addition of bicycle lanes provides cyclists with their own lane and reduces their level of traffic stress. The number of conflicts between cyclists and vehicles is reduced, thus making bicycle travel more accommodating. The replacement of sidewalks enhances the pedestrian experience along Route 107.	reduced with fewer bus stops. Updating the existing bus stops to be ADA compliant also increases the accessibility of transit to all users. The reduction of lane width and addition of primarily protected buffered bicycle lanes provides cyclists with their own lane and reduces their level of traffic stress. The number of conflicts between cyclists and vehicles is reduced, thus making bicycle travel more accommodating. The replacement of sidewalks enhances the pedestrian experience along Route 107. The addition of sidewalks and crosswalks on the west side of Route 107 provides a facility for pedestrians that did not previously exist and expands the pedestrian network.	ADA compliant also increases the accessibility of transit to all users. The reduction of lane width and addition of non-buffered and protected buffered bicycle lanes provides cyclists with their own lane and reduces their level of traffic stress. The replacement of sidewalks enhances the pedestrian experience along Route 107. The extension of the island and installation of crosswalks improves pedestrian visibility and accessibility at the Dalton Pkwy/Jackson St intersection. The proposed shared street concept offers an opportunity to provide an area in which pedestrians, bicyclists, and motorists seeking access to abutting properties can coexist in a calm low speed area.
Safety			
Vehicular safety	The reduction in lane width serves as a traffic calming measure and discourages speeding along Route 107. Adding left turn lanes with protected phases at the Chestnut Street and	The reduction in lane width serves as a traffic calming measure and discourages speeding along Route 107. Vehicular clearance intervals were adjusted based on MassDOT	The reduction in lane width serves as a traffic calming measure and discourages speeding along Route 107. Vehicular clearance intervals were adjusted based on MassDOT standards to reduce

	Chatham Street intersections reduces the number of conflicts involving left-turning vehicles. Vehicular clearance intervals were also adjusted based on MassDOT standards to reduce the amount of crashes due to conflicts at the signalized intersections. Access management along the southern part of the study area limits the amount of conflict points both at the intersection and along the travel way which also increases safety.	standards to reduce the amount of crashes due to conflicts at the signalized intersections.	the amount of crashes due to conflicts at the signalized intersections.
Bicycle and pedestrian safety	Reducing the travel lane widths and vehicle speeds increases the safety of pedestrians and bicycles in the study area. Introducing and/or enhancing the separate facilities for both bicycles and pedestrians also increases safety because it minimizes the interaction with vehicles.	Reducing the travel lane widths and vehicle speeds increases the safety of pedestrians and bicycles in the study area. Introducing and/or enhancing the separate facilities for both bicycles and pedestrians also increases safety because it minimizes the interaction with vehicles. Removing the exclusive westbound right-turn lane at Walmart & Hawthorne Square Mall allows for the reduction in crossing length for pedestrians, thus decreasing their amount of exposure.	Reducing the travel lane widths and vehicle speeds increases the safety of pedestrians and bicycles in the study area. Introducing and/or enhancing the separate facilities for both bicycles and pedestrians also increases safety because it minimizes the interaction with vehicles.

		Extending the island at Jackson Street and Dalton Parkway provides a pedestrian refuge area.	
Land Use and Economic Development			
Supports development	Reducing vehicular congestion and enhancing pedestrian, bicycle and bus access supports local businesses in the Lynn segment of the study area. On-street parking is reduced by 33 spaces overall in this segment. Most of the eliminated parking is a consequence of safety improvements at high crash locations. Overall, this segment would have approximately 97 on-street spaces under the Build scenario.	The proposed improvements include consideration of traffic associated with the Cinema World development. Improved traffic operations, and pedestrian, bicycle and bus accommodations provide multimodal access to businesses in this segment of the study area. Replacing the median guardrail with a landscaped median improves the attractiveness of the study area for business development.	The proposed improvements are consistent with the redevelopment plans for Salem Hospital (NSMC) and the North River Canal area. Vehicle operations are improved by adding turn lanes, installing a signal at NSMC, and optimizing signal timing/coordination to accommodate growth in vehicular traffic. Reducing lane width and providing bicycle and pedestrian accommodations enhances safety and provides multimodal travel options to the NSMC and mixed use developments in the North River Canal area.
Improves access for all modes	The proposed improvements improve safety and reduce congestion, thereby improving vehicular access to parcels in the study area. Improved pedestrian, bicycle, and transit accommodations results in improved access by alternate modes.		
Environmental Effects			
Air quality	Improving traffic operations to reduce congestion also reduces emissions for all study area segments		
Environmental resources	All proposed work is within existing ROW which avoids impacts to Buchanan Bridge Pond. Permitting	Limited ROW acquisition is required in this segment. The improvements avoid impact to the Forest River	All proposed work is within existing ROW. No

	requirements to be determined during design.	crossing under Route 107 south of Swampscott Road and an unnamed stream and wetlands between First Street and Salem High School. Permitting requirements to be determined during design.	environmental resources abutting the ROW.
Community, Health, and Social Equity			
Enhance attractiveness for residents and businesses	New lane striping, addition of bicycle lanes and replacement of sidewalks enhances visual attractiveness.	Replacing the median guardrail and providing a landscaped median, continuous sidewalks, and a bicycle lane on both sides of Route 107 enhances visual attractiveness of the study area.	Revised striping, addition of bicycle lanes and replacement of sidewalks enhances visual attractiveness. Realignment of Route 107 at Boston Street provides opportunities for landscaping.
Health	Improved pedestrian and bicycle facilities in the study area would increase opportunities for active transportation.		
Environmental Justice	The online survey and public information materials were provided in English and Spanish to allow for more inclusive participation by study area stakeholders. The proposed improvements are generally within the existing right-of-way. No significant impacts have been identified, and therefore there are none that would disproportionately affect the EJ communities in the study area. The proposed improvements provide a benefit by enhancing pedestrian, bicycle and bus transit facilities, and improving bus operations within the study area.		
Constructability			
Minimize impacts to private property, drainage, utilities and ledge.	Limiting improvements to the existing roadway right-of-way and maintaining the existing curb line minimizes impacts to the existing drainage system, underground and overhead utilities, adjacent ledge outcrops, and private property.	Generally limiting improvements to the existing roadway right-of-way and maintaining the existing curb line minimizes impacts to the existing drainage system, underground and overhead utilities, adjacent	Limiting improvements to the existing roadway right-of-way and maintaining the existing curb line minimizes impacts to the existing drainage system, underground and overhead utilities, adjacent ledge outcrops, and private property.

		ledge outcrops, and private property. Rerouting zig zag traffic to First Street/Traders Way avoids widening Highland Avenue, and therefore avoids major impacts to adjacent private property, ledge outcrops, the existing drainage system, and underground and overhead utilities. It does require right-of-way at the Marlborough Road intersection.	
Cost			
Capital Construction Cost in 2016 $[1]	$6,000,000	$14,600,000	$4,900,000

1 – Capital construction cost based on 2016 construction costs. Costs do not include design, right-of-way, or utility relocation.

VII. IMPLEMENTATION

Implementation of the recommendations presented in this report is dependent upon the entity with jurisdiction of the roadway (see Figure 2.2). Western Avenue from Chestnut Street to the southern end of the Buchanan Bridge is under the City of Lynn's jurisdiction. Reconfiguration of the Chestnut Street and Chatham Street intersections, a new traffic signal at Eastern Avenue, reconfiguration of travel lanes to incorporate bicycle lanes, and any parking spot removals are examples of recommendations that would need to be borne by the City.

The City of Salem has jurisdiction of Highland Avenue and Essex Street from Greenway Road up to the end of the study area at Boston Street. Addition of a new signal at Salem Hospital's Upper Driveway, extension of the island at the Jackson Street/Dalton Parkway intersection, and reconstruction of the Essex Street/Boston Street intersection are examples of recommendations that would need to be borne by the City.

Between the southern end of the Buchanan Bridge in Lynn and Greenway Road in Salem the study area is under MassDOT jurisdiction. Given that pieces of the northern study area segment fall under both MassDOT and City of Salem jurisdiction attention should be given to ensure implementation of study area-wide elements (such as the center lane and bicycle lanes) are carried out in tandem.

MassDOT Project Development and Design Process

Transportation decision-making is complex and can be influenced by legislative mandates, environmental regulations, financial limitations, agency programmatic commitments, and partnering opportunities. Project development is the process that takes a transportation improvement from conception through construction. Decision-makers and reviewing agencies, when consulted early and often throughout the project development process, can ensure that all participants understand the potential impact these factors may have on project implementation.

The MassDOT Highway Division has developed a comprehensive project development process which is contained in Chapter 2 of the MassDOT Highway Division's Project Development and Design Guide. The eight-step process covers a range of activities extending from identification of a project need, through completion of a set of finished contract plans, to construction of the project. The sequence of decisions made through the project development process progressively narrows the project focus, while developing greater design details, and ultimately leads to a project that addresses the identified needs in the most cost-effective and publicly acceptable way. The Route 107 Corridor Study has been structured to meet the first two steps of the project development process: I - Needs Identification and II - Planning. The more-detailed descriptions provided in the following sections are focused on the process for a roadway project, but the same basic process would need to be followed for non-roadway projects as well.

Step I: Needs Identification

For each of the locations at which an improvement is to be implemented, MassDOT leads an effort to define the problem, establishes project goals and objectives, and defines the scope of the planning needed for implementation. To that end, it has to complete a Project Need Form (PNF), which states in general terms the deficiencies or needs related to the transportation facility or location. The PNF documents the problems and explains why corrective action is needed. For this study, the information defining the need for the project would be drawn primarily, perhaps exclusively, from the present report. Also, at this point in the process, MassDOT meets with potential participants, such as the Metropolitan Area Planning Council (MAPC) and community members, to allow for an informal review of the project.

The PNF is reviewed by the MassDOT Highway Division District 4 office whose jurisdiction includes the location of the proposed project. MassDOT also sends the PNF to the MPO, for informational purposes. The outcome of this step determines whether the project requires further planning, whether it is already well supported by prior planning studies, and, therefore, whether it is ready to move forward into the design phase, or whether it should be dismissed from further consideration.

Step II: Planning

This phase would likely not be required for the implementation of the improvements proposed in this planning study, as this planning report should constitute the outcome of this step. However, in general, the purpose of this implementation step is for the project proponent to identify issues, impacts, and approvals that may need to be obtained, so that the subsequent design and permitting processes are understood.

The level of planning needed varies widely, based on the complexity of the project. Typical tasks include: define the existing context, confirm the project need, establish goals and objectives, initiate public outreach, define the project, collect data, develop and analyze alternatives, make recommendations, and provide report documentation. Likely outcomes include consensus on the project definition to enable it to move forward into environmental documentation (if needed) and design, or a recommendation to delay the project or dismiss it from further consideration.

Step III: Project Initiation

At this point in the process the proponent, MassDOT Highway Division, completes a Project Initiation Form (PIF) for each improvement, which is reviewed by its Project Review Committee (PRC) and the MPO, in this case the MAPC. The PRC is composed of the Chief Engineer, each District Highway Director, and representatives of the Project Management, Environmental, Planning, Right-of-Way, Traffic, and Bridge departments, and the Federal Aid Program Office (FAPO). The PIF documents the project type and description, summarizes the project planning process, identifies likely funding and project management responsibility, and defines a plan for interagency and public participation. First the PRC reviews and evaluates the proposed project

based on the MassDOT‟s statewide priorities and criteria. If the result is positive, MassDOT Highway Division moves the project forward to the design phase and to programming review by the MPO. The PRC may provide a Project Management Plan to define roles and responsibilities for subsequent steps. The MPO review includes project evaluation based on the MPO‟s regional priorities and criteria. The MPO may assign project evaluation criteria score, a Transportation Improvement Program (TIP) year, a tentative project category, and a tentative funding category.

Step IV: Environmental Permitting, Design, and Right-of-Way Process

This step has four distinct but closely integrated elements: Public Outreach, Environmental Documentation and Permitting (varying levels, if required), Design, and Right-of-Way Acquisition (if required). The outcome of this step is a fully designed and permitted project ready for construction. The sections below provide more detailed information on the four elements of this step of the project development process.

Public Outreach

Continued public outreach in the design and environmental process is essential to maintain varying levels of public support for the project and to seek meaningful input on the design elements. The public outreach is often in the form of required public hearings (conducted at the 25% and 100% design milestones), but can also include less formal dialogues with those interested in and affected by a proposed project.

Environmental Documentation and Permitting

The project proponent, in coordination with the Environmental Services section of the MassDOT Highway Division, is responsible for identifying and complying with all applicable federal, state, and local environmental laws and requirements. This includes determining the appropriate project category for both the Massachusetts Environmental Protection Act (MEPA) and the National Environmental Protection Act (NEPA). Environmental documentation and permitting is often completed in conjunction with the Preliminary Design phase described below.

Design

There are three major phases of design. The first is Preliminary Design, which is also referred to as the 25-percent submission. The major components of this phase include a full survey of the project area, preparation of base plans, development of basic geometric layout, development of preliminary cost estimates, and submission of a functional design report. Preliminary Design, although not required to, is often completed in conjunction with the Environmental Documentation and Permitting.

The next phase is Final Design, which is also referred to as the 75% and 100% submission. The major components of this phase include preparation of a subsurface exploratory plan (if required), coordination of utility relocations, development of temporary traffic control plans

through construction zones, development of final cost estimates, and refinement and finalization of the construction plans. Once Final Design is complete, a full set of Plans, Specifications, and Estimates (PS&E) is developed for the project.

Right-of-Way Acquisition

A separate set of Right-of-Way plans is required for any project that requires land acquisition or easements. The plans must identify the existing and proposed layout lines, easements, property lines, names of property owners, and the dimensions and areas of estimated takings and easements.

Step V: Programming (Identification of Funding)

Programming, which typically begins during the design phase, can actually occur at any time during the process, from planning to design. In this step, which is distinct from project initiation, the proponent requests that the MPO include the project in the region's Transportation Improvement Program (TIP) process. The proponent requesting the project's listing on the TIP can be the community or it can be one of the MPO member agencies (the Regional Planning Agency, MassDOT, and the Regional Transit Authority). The MPO then considers the project in terms of state and regional needs, funding availability, project readiness, evaluation criteria, and compliance with the Regional Transportation Plan and decides whether to place it in the Draft TIP for public review and then in the Final TIP. A project does not have to be fully designed in order for the MPO to program it in the TIP, but generally a project has reached 75-percent design to be programmed in the year-one element of the four-year TIP.

Step VI: Procurement

Following project design and programming of a highway project, the MassDOT Highway Division publishes a request for proposals, which is also often referred to as being „advertised" for construction. MassDOT then reviews the bids, and awards the contract to the qualified bidder with the lowest bid.

Step VII: Construction

After a construction contract is awarded, MassDOT Highway Division and the contractor develop a public participation plan and a temporary traffic control plan for the construction process.

Step VII: Project Assessment

The purpose of this step is to receive constituents" comments on the project development process and the project's design elements. MassDOT Highway Division can apply what is learned in this process to future projects

Table VII.1 contains the summary of these steps along with their effect on the project schedule and lists approximate duration ranges associated with each step.

Table VII.1: Project Development Schematic Timetable

Description	Schedule Influence	Typical Duration
Step I: Problem/Need/Opportunity Identification The proponent completes a Project Need Form (PNF). This form is then reviewed by the MassDOT District office, which provides guidance to the proponent on the subsequent steps of the process.	The PNF has been developed so that it can be prepared quickly by the proponent, including any supporting data that is readily available. The District office shall return comments to the proponent within one month of PNF submission.	1 to 3 months
Step II: Planning Project planning can range from agreement that the problem should be addressed through a clear solution to a more-detailed analysis of alternatives and their impacts.	For some projects, no planning beyond preparation of the PNF is required. While other projects require a planning study centered on specific project issues associated with the proposed solution or a narrow family of alternatives. More complex projects would likely require a detailed alternatives analysis.	Project Planning Report: 3 to 24+ months
Step III: Project Initiation The proponent prepares and submits a Project Initiation Form (PIF) and a Transportation Evaluation Criteria (TEC) form in this step. The PIF and TEC are informally reviewed by the Metropolitan Planning Organization (MPO) and MassDOT District office, and formally reviewed by the Project Review Committee (PRC).	The PIF includes refinement of the preliminary information contained in the PNF. Additional information summarizing the results of the planning process, such as the Project Planning Report, is included with the PIF and TEC. The schedule is determined by PRC staff review (dependent on project complexity) and meeting schedule.	1 to 4 months
Step IV: Design, Environmental, and Right of Way The proponent completes the project design. Concurrently, the proponent completes necessary environmental permitting analyses and files applications for	The schedule for this step is dependent upon the size of the project and the complexity of the design, permitting, and right-of-way issues. Design review by the MassDOT District and appropriate sections is completed in this step.	3 to 48+ months

permits. Any right of way needed for the project is identified and the acquisition process begins.		
Step V: Programming The MPO considers the project in terms of its regional priorities and determines whether or not to include the project in its Draft Transportation Improvement Program (TIP) which is then made available for public comment. The TIP includes a project description and funding source.	The schedule for this step is subject to each MPO‟s programming cycle and meeting schedule. It is also possible that the MPO would not include a project in its Draft TIP based on its review and approval procedures.	3 to 12+ months
Step VI: Procurement The project is advertised for construction and a contract awarded.	Administration of competing projects can influence the advertising schedule.	1 to 12 months
Step VII: Construction The construction process is initiated including public notification and any anticipated public involvement. Construction continues to project completion.	The duration for this step is entirely dependent upon project complexity and phasing.	3 to 60+ months
Step VIII: Project Assessment The construction period is complete and project elements and processes are evaluated on a voluntary basis.	The duration for this step is dependent upon the proponent‟s approach to this step and any follow-up required.	1 month

Source: MassDOT Highway Division Project Development and Design Guide

The project development process described previously is based on a conventional project delivery method, commonly referred to as “Design-Bid-Build” (D-B-B). The essence of the D-B-B process is that project is designed to the PS&E level and then advertised for construction, i.e. the design and construction are carried out sequentially. Under this scenario the engineer of record (designer) and the construction contractor are two separate contracting entities. A schematic timeline illustrating this process is shown in Figure VII-1, and for the purpose of this discussion assumes aggressive durations and that construction funding would be available at the end of the design phase.

Route 107 Corridor Project (Conventional Delivery Method)

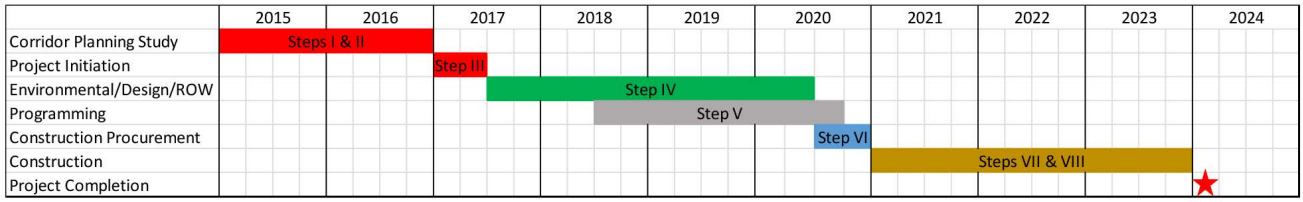


Figure VII-1: Schematic Implementation Timeline for a Design-Bid-Build Project

1. ENVIRONMENTAL CONSIDERATIONS

Environmental Documentation and Permitting

The project proponent, in coordination with the Environmental Services section of the MassDOT Highway Division, is responsible for identifying and complying with all applicable federal, state, and local environmental laws and requirements. This includes determining the appropriate project review documentation category for both the Massachusetts Environmental Policy Act (MEPA) and the National Environmental Policy Act (NEPA). Environmental documentation and permitting is often completed in conjunction with the Preliminary Design phase described below.

Going forward, in the Environmental Permitting and Design phases, any proposed study area improvements must comply with both the Massachusetts (MEPA) and National (NEPA) Environmental Policy Acts. It is anticipated that the study area improvements would be supported in part by federal funds, and therefore would also require review under Section 106 of the National Historic Preservation Act of 1966, as amended. In addition, due to the presence of wetland resource areas in close proximity to the Route 107 right-of-way, such as Floating Bridge Pond and the Forest River, the proposed improvements also require compliance with the Massachusetts Wetlands Protections Act and its implementing regulations (310 CMR 10.00).

2. ENVIRONMENTAL POLICY ACTS

The project proponent, in coordination with the Environmental Services section of the MassDOT Highway Division, is responsible for identifying and complying with all applicable federal, state, and local environmental laws and requirements. This includes determining the appropriate project documentation category for both MEPA and NEPA. Environmental documentation and permitting is often completed in conjunction with the Preliminary Design phase.

NEPA does not establish any quantitative thresholds for the environmental classification of a transportation improvement project. Transportation projects vary in type, size and complexity, and potential effect to the environment. The effects of such projects can vary from very minor to significant impacts to the human environment. To account for the variability of project impacts,

three basic “classes of action” are allowed to determine how compliance with NEPA is carried out and documented.

- An Environmental Impact Statement (EIS) is prepared for projects where it is know that the action would have a significant impact on the environment
- An Environmental Assessment (EA) is prepared for actions in which the significance of the environmental impact is not clearly established. Should environmental analysis and interagency review during the EA process find a project to have no significant impacts on the quality of the environment, a Finding of No Significant Impact (FONSI) is issued
- Categorical Exclusions (CEs) are issued for actions that do not individually or cumulatively have a significant impact on the environment.

Since the proposed Route 107 improvements occur largely within the existing highway right-of-way, they are not anticipated to result in a significant impact on the environment and a Categorical Exclusion (CE) is likely to be the appropriate class of action. The CE would be prepared in accordance with the *Programmatic Agreement between the Federal Highway Administration, Massachusetts Division and the Massachusetts Department of Transportation for Determinations and Approvals of Categorical Exclusions under the National Environmental Policy Act* (May 2016).

The MEPA process includes eleven review thresholds that identify categories for projects that are likely to cause damage to the environment. These review thresholds determine whether MEPA review is required. MEPA review is required when one or more review thresholds are met or exceeded and the subject matter of a least one review threshold is within MEPA jurisdiction. A review threshold that is met or exceeded also specified whether MEPA review shall consist of an Environmental Notification Form (ENF) and a mandatory Environmental Impact Report (EIR), or an ENF and other MEPA review if the Secretary of the Executive Office of Energy and Environmental Affairs so requires.

For the Route 107 study area improvements the following MEPA review thresholds that may require an ENF or an EIR were evaluated:

1. **Land -** The improvements are largely within the existing right-of-way and do not trigger any thresholds for alteration land, creation of new impervious surface, or impact Article 97 land (public lands with natural resources).
2. **Wetlands -** The improvements are adjacent to wetlands, but none of the thresholds established for wetlands impacts would be exceeded if the improvements were implements

3. **Transportation** – The study area improvements do not meet any thresholds requiring an EIR. In addition the improvements do not meet the following ENF thresholds:
    - Construction of a new roadway one- quarter mile long or widening of an existing roadway by four or more feet
    - Cutting five or more living public shade trees whose diameter is 14" or greater.
    - Generation of 2,000 or more new ADT, or 1,000 or more ADT with 150 new parking spaces
    - Construction of 300 or more new parking spaces.
4. **Historic and Archeological Resources –** The improvements do not require demolition of a historic structure or archeological site, and therefore does not meet the MEPA threshold for this category.

Several MEPA thresholds do not apply to this study: Water, Wastewater, Energy, Air, Solid and Hazardous Waste, State-listed Endangered Species, Areas of Critical Environmental Concern, and Regulations.

Given that the proposed improvements are primarily within the existing right-of-way, the proposed improvements do not meet any MEPA thresholds for an EIR or an ENF. This would need to be confirmed during the Preliminary Design phase.

APPENDIX A

Public Survey

Online Survey
English

Route 107 Corridor Study:
Online Survey Results

Introduction

The Massachusetts Department of Transportation (MassDOT), in coordination with the Cities of Salem and Lynn, is conducting a study of the Route 107 corridor. This study will propose improvements to address existing transportation issues for motorists, transit users, pedestrians, and bicyclists along Route 107 from Chestnut Street in Lynn to Boston Street in Salem.

Online Questionnaire

MassDOT developed an online survey to ask users to help identify issues and to recommend ideas related to improvements for transit users, motorists, pedestrians, and bicyclists. The survey was available in English and Spanish. It was made available through links publicized by email to the project database and Working Group, which includes representatives of employers, chambers of commerce, community groups, elected officials and more. The study team asked Working Group members to help distribute flyers to members of their organizations and others who may be interested.

On October 20, 2015 members of the study team distributed bilingual flyers to all residences, businesses, schools, and hospitals immediately abutting the Route 107 corridor. A media advisory was sent to local newspapers, including *The Daily Item, Salem Gazette, Salem News* and *Boston Globe North*. *The Patch* and *Boston Globe* featured articles describing the study and linking to the survey.

At the January 27, 2016 public meeting, the study team reminded participants to take the survey before it closed. The notifications and advertisements related to the public meeting also included a reminder about the survey.

The survey was available from October 14, 2015 to February 1, 2016. 1,672 people accessed the questionnaire, including two in Spanish. The top referrer sites[1] were a direct link to the survey (521), the MassDOT website (335), Facebook (237), a direct email from MassDOT (141), and links from media sources such as *Lynn Matters*, *The Patch*, *Salem News* and the *Boston Globe* (333).

While not all questions were completed in full by each respondent, the project team is confident that the results provide a helpful snapshot of travel habits, feedback on current conditions and suggestions to improve the corridor for multiple modes.

While the advantages of online surveys are that they save time and can provide access to a diverse group of individuals, sample issues can result. Demographic information provided by the respondent is self-reported, and the non-response rate is difficult to estimate. For example, the project team does not know how many people learned about the survey and chose not to complete

[1] A referrer is the webpage a respondent visited immediately before beginning the survey.

it. There is a self-selection bias in terms of who responds to the questionnaire; it is primarily people who already know about the project, those who regularly have contact with one of the referring sources, and those who have the time and inclination to participate. It is unlikely that a user of Route 107 without these project or community connections may even learn about the survey effort. Therefore, the results of the survey are not intended to be statistically significant, using scientific sampling methods. They do, on the other hand, provide insight into opinions of some of the users.

Who Are the Respondents?

The age of survey respondents is slightly older than the age group profile of the adult population of Essex County, based on the 2010 U.S. Census (see Table 1). Over 45% of respondents are between the ages of 45 and 64. 12% of respondents chose not to self-identify by race for the study. Among those who did self-identify, there were very few Asian (1%) or Black or African American (1%) respondents, compared to Essex County census population (Asian: 3%; Black or African American: 5%). According to the 2010 Census, 16.5% of people who live in Essex County identify as Hispanic. Only 3% of survey respondents identified as Hispanic. The median household income in Essex County is $67,311. While 26% of respondents chose not to disclose household income, only 34% had household incomes of $69,999 or less among those who responded.

Table 1: Respondent Age

Response	Chart	Percentage	Count
Under 18		0.4%	4
18 to 21		0.5%	5
22 to 34		15.2%	158
35 to 44		18.9%	196
45 to 64		46.8%	486
65 or over		16.0%	166
Prefer not to say		2.3%	24

Respondents were asked if they lived, worked and/or went to school in the Route 107 corridor. They were allowed to select more than one response. Almost half the respondents (47%) live in the corridor and 20% work in the corridor. Very few respondents (4%) go to school in the corridor.

Only 2% of the respondents (39) said they own a business in the Route 107 corridor.

Few respondents are transit-dependent; over 98% have a valid driver's license, and over 90% have a private automobile available to them.

When asked when they are most likely to use the corridor, the two most popular choices were weekday rush hours (41%) and "varies" (38%).[2] The most popular area destinations were Hawthorne Square Mall Shopping Center, North Shore Medical Center and Walmart.

74% of respondents use *both* the Swampscott Rd, Route 107 and Marlborough Road route and the Swampscott Rd., First Street, Traders Way and Marlborough Road route to travel between Swampscott Road and Marlborough Road (see Figure 1).

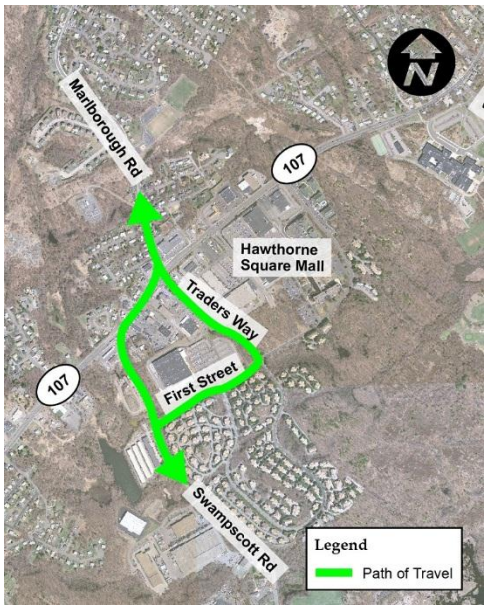


Figure 1: Path of Travel between Swampscott and Marlborough Roads

Driving

The majority of respondents drive personal vehicles in the corridor for recreation (events, shopping, dining and errands) at least occasionally (60%). About one-third of respondents (38%) use the corridor to commute to work daily, but another third (33%) report "never" using the corridor to commute to work.

Respondents were asked about how frequently they experienced congestion in the Route 107 corridor in a number of segments: from Chestnut Street to Eastern Avenue; from Eastern Avenue to the Walmart; from the Walmart to Hawthorne Square Mall (First Street area); and from First Street

[2] Respondents were able to select more than one response to this question.

to Boston Street. While a majority of respondents reported experiencing traffic congestion either "frequently" or "usually" for the segments from Eastern Avenue in Lynn all the way to Boston Street in Salem, these rates were generally higher for the Walmart to Hawthorne Square Mall (76%) and First Street to Boston Street segments (69%). Even the segment from Chestnut Street to Eastern Avenue in Lynn saw 41% of respondents experiencing congestion "frequently" or "usually."

Respondents were then asked about the extent to which safety improvements are needed in these segments of the corridor. A majority of respondents saw the need as a "great" or "very great" extent for the Walmart to Hawthorne Square Mall (66%) and First Street to Boston Street (60%) segments.

Respondents were also asked to share the type of roadway improvements that they would like to see in the Route 107 corridor (see Table 2). Of the listed potential improvements, a majority of respondents saw left-turn lanes (75%) and median separation with U-turn provisions (57%) as "desirable" or "very desirable."

Table 2: Desired Types of Roadway Improvements

	Very undesirable	Undesirable	Neutral	Desirable	Very desirable
More roundabouts	39.8%	21.6%	24.5%	7.7%	6.5%
Addition of median islands	16.9%	15.2%	38.1%	22.6%	7.2%
Speed bumps (to slow down motorists)	42.1%	26.5%	18.0%	7.9%	5.5%
Right-in, right-out driveway access (no left turns in and out)	12.9%	13.4%	29.0%	30.1%	14.6%
Sidewalk bump-outs (for traffic calming)	16.8%	16.0%	31.9%	24.0%	11.3%
Left-turn lanes	5.4%	3.8%	16.1%	39.6%	35.1%
Median separation with U-turn provisions	9.6%	8.4%	24.6%	35.2%	22.1%

Respondents were also given the opportunity in an open-ended question to share additional improvements they would make to the. Suggestions included:

- Improvements in traffic signal timing at a variety of intersections, including Eastern and Western Avenues
- Increasing the number of lanes/widening the roadway
- Repaving/repairing the roadway
- Reductions in development
- Enforcement of speed limits

Walking

Few respondents walk in the Route 107 area, and if they do, it is rarely to get to public transit, commute to school or commute to work. In fact, over 70% of all respondents "never" walk in the Route 107 area for these purposes, despite the fact that a majority report being comfortable walking for transportation purposes for up to ½ mile. While 43% of respondents "never" walk in the corridor for recreation purposes, some walk in the area regularly (20%) or daily (11%) for these purposes. Of all the segments of the corridor, respondents were most likely to walk between First Street and Boston Street, though 39% still say it was "extremely unlikely" that they walk there.

A majority of respondents report that the major barriers to walking short trips in the area are that the walking areas are too close to heavy traffic (68%), the sidewalks/paths/crossings are in poor condition (62%), and there is a concern about personal safety or security (53%).

Respondents were also encouraged to share other barriers to walking in the corridor as part of an open-ended question. Barriers included:

- Crossings are too few and inconvenient
- Not enough sidewalks
- Sidewalks are not maintained/cleared of snow
- Failure to enforce laws to protect pedestrians from traffic

To overcome the barriers, respondents favored a number of improvements including more pedestrian crossings, pedestrian refuge islands at intersections, improvements to curb ramps and accessibility for people with disabilities, more buffer between the sidewalk and vehicle traffic, better lighting or security measures, wider sidewalks and better sidewalk maintenance (see Table 3).

Table 3: Improvements to Promote Walking

	Not at all Important	Somewhat Important	Important	Very Important
Longer WALK signals at crossings	24.6%	32.8%	25.3%	17.3%
More pedestrian crossings	16.8%	30.1%	30.5%	22.6%
Raised crosswalks	31.9%	26.6%	24.5%	17.1%
Pedestrian refuge islands at intersections	14.6%	28.3%	36.2%	20.8%
Better signs	13.3%	22.4%	35.9%	28.4%
Sidewalk bump-outs (to reduce pedestrian crossing widths)	30.7%	31.1%	24.7%	13.5%
Improved curb ramps and accessibility for people with disabilities	12.6%	20.9%	34.0%	32.6%
Slower traffic	23.6%	25.7%	24.5%	26.2%
More buffer between the sidewalk and vehicle traffic	14.3%	22.7%	30.2%	32.7%
Better lighting or security measures	10.7%	17.2%	32.8%	39.3%
Wider sidewalks	16.9%	23.6%	30.5%	29.0%
Better sidewalk maintenance (repair of infrastructure or removal of snow/debris)	7.2%	10.3%	29.7%	52.8%
Increased education and enforcement of pedestrian traffic laws	15.2%	24.5%	28.0%	32.4%
Shorter pedestrian crossing distances	21.7%	31.3%	28.8%	18.2%

Public Transportation

Very few respondents are regular users of public transportation in the Route 107 corridor, regardless of trip purpose. If respondents did take public transportation, even "rarely," it tended to be for recreation. Even for that trip purpose, 76% of respondents reported "never" using public transportation in the corridor.

A majority of respondents reported that the major barrier to using public transportation in the corridor is that it is not as convenient as using the personal vehicle. As noted earlier, the respondents to this survey are generally not transit-dependent and appear to want to use personal vehicles as a matter of choice. Issues of schedule and routing do not seem to have an effect on the reasons respondents choose to use personal vehicles.

Respondents were also encouraged to share other barriers to using public transportation in the corridor as part of an open-ended question. Barriers included:

- Lack of information (location of stops, schedule, fares)
- Unreliability of service
- Infrequent service/no service to Boston on weekends
- Lack of amenities (benches, shelters) at bus stops

Bicycling

Over 90% of respondents report "never" using a bicycle to get to public transit, commute to school or commute to work. About three-quarters of respondents (77%) report "never" using a bicycle for recreation either. This is true for users in all segments of the corridor, though users are less likely to bike in the segments from Chestnut Street in Lynn to the Walmart in Salem. While half the respondents (50%) report that they do not ride bikes and have no plans to start, about 30% report that they are "casual" or "experienced" bicycle users.

Respondents were asked about what improvements would be needed to bike in the Route 107 corridor (see Table 4). Of the listed improvements, off-road bike paths, improved buffers between bicyclists and vehicles, increased maintenance, and less traffic were seen as the most important.

Respondents were also encouraged to share other improvements that could be made as part of an open-ended question. Many respondents in this section said that bikes should not be allowed on the roadway in general. Suggestions for improvements included:

- Protected lanes
- Protectedintersections (including bike boxes)
- Reduction in traffic speed

Table 4: Improvements Needed for Biking

	Not at all Important	Somewhat Important	Important	Very Important
More bike lanes	36.5%	17.6%	17.9%	28.0%
Off-road bike paths	31.0%	14.3%	18.1%	36.6%
Wider outside lanes (easier to share lane with cars)	37.2%	17.8%	20.5%	24.5%
Improved buffers between bicyclists and vehicles	31.1%	13.0%	20.5%	35.4%
Better bicycle parking and storage	40.7%	19.4%	19.3%	20.6%
More on-road bike signage (share the road signs/bike may use full lane signs)	36.3%	20.4%	19.2%	24.1%
Better bike accommodation through intersections (bike boxes)	35.9%	18.1%	21.8%	24.1%
Slower traffic	39.0%	19.0%	19.9%	22.0%
More and better bike route wayfinding signs and bike maps	36.7%	21.1%	20.5%	21.7%
Increased maintenance (street sweeping/repair of roads)	27.9%	13.5%	21.4%	37.2%
Increased enforcement of and education about traffic laws	30.9%	15.3%	22.0%	31.8%
Colored asphalt for bike lanes	35.3%	18.3%	22.2%	24.1%
Less traffic	33.1%	17.7%	19.0%	30.2%

Other Comments

Respondents were also asked to name the number one improvement they would make to the Route 107 Corridor. Improvements included the following:

- Reducing traffic
- Improving left-hand turns
- Retiming light signals
- Repaving the roadway/fixing potholes
- Restriping the roadway for better lane/turning movements
- Adding sidewalks
- Adding bike lanes
- Better roadway maintenance

The word cloud below (see Figure 2) is comprised of the open-ended responses to this question. The word cloud demonstrates that traffic is the issue that overwhelmingly dominant in all of the open-ended responses.

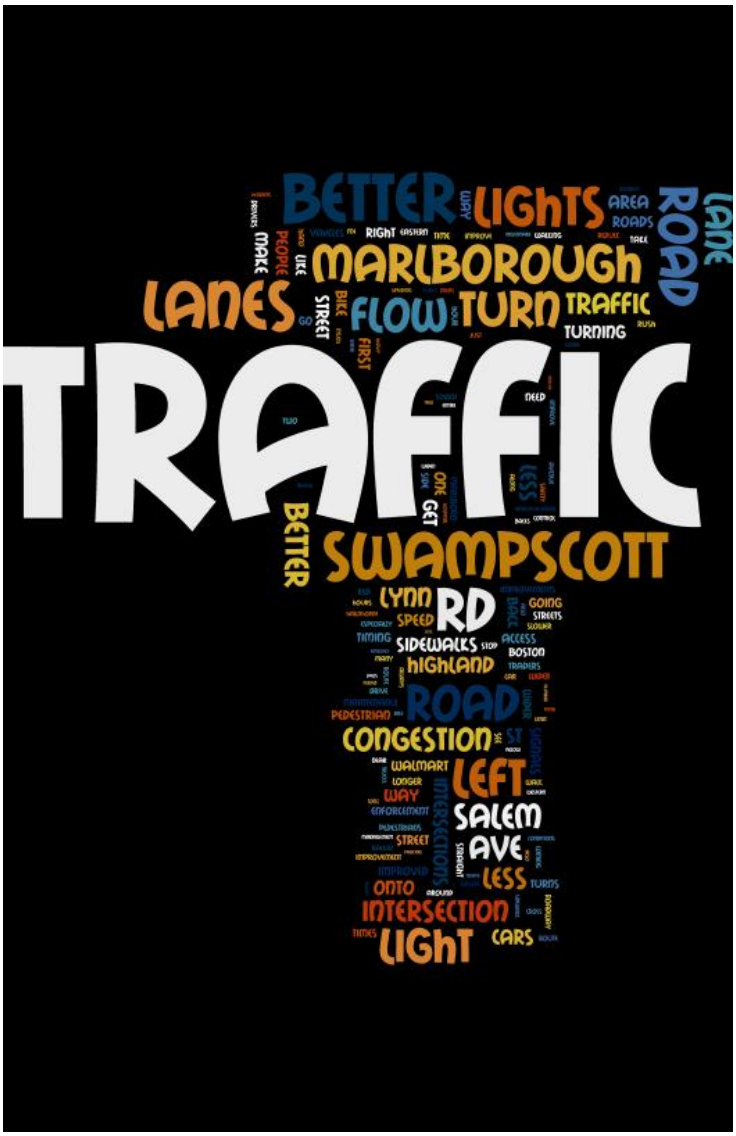


Figure 2: Word Cloud of Suggested Improvements

Conclusion

The results of the online survey are consistent with the data gathered during the study's existing conditions analysis. The answers to multiple choice questions and extensive written responses to open ended questions provide illumination and detail that support the technical analysis completed to date. MassDOT will consider the responses regarding preferred improvements as the project progresses to the alternatives development phase.

Route 107 Corridor Study

About this Survey

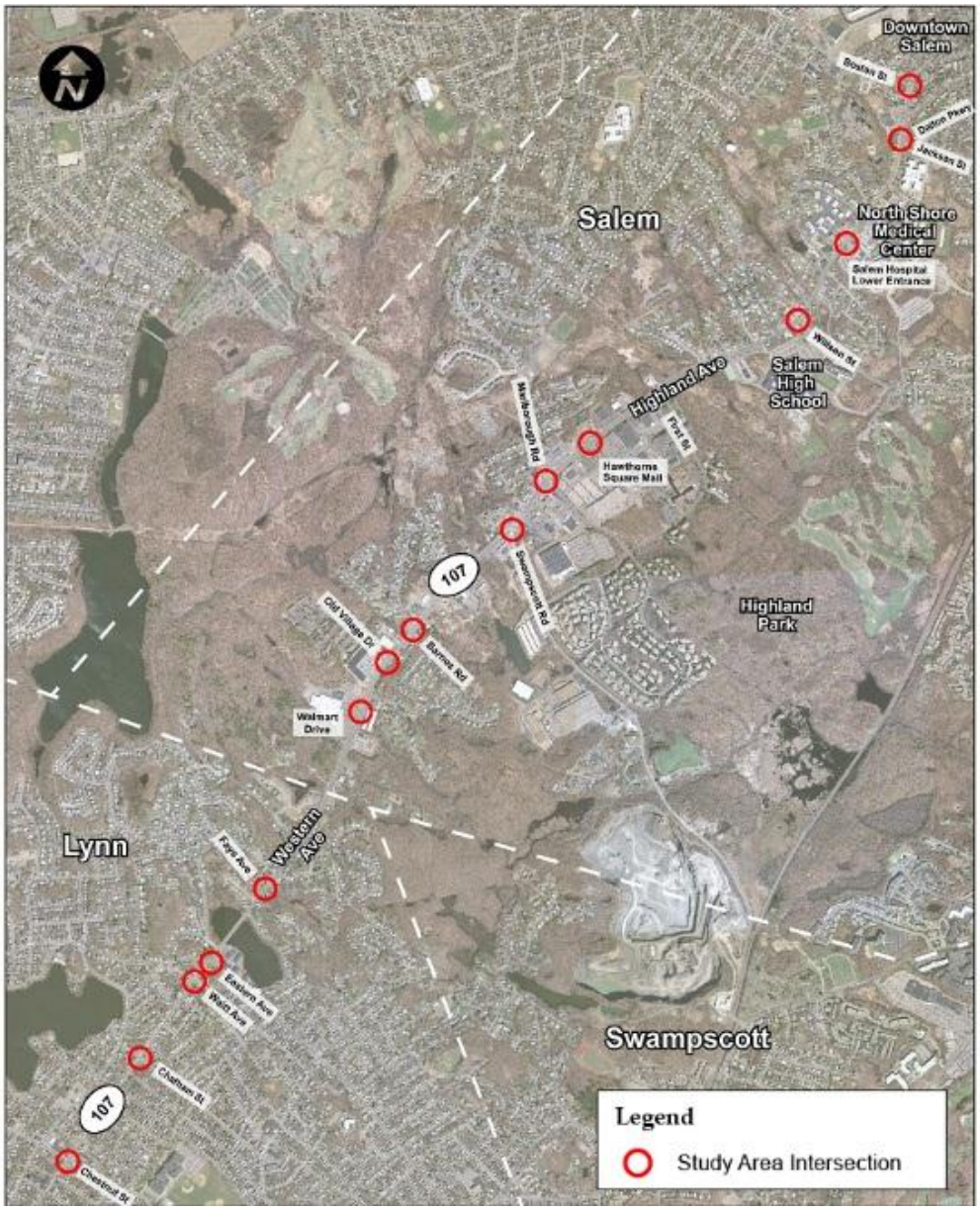
Massachusetts Department of Transportation (MassDOT), in coordination with the Cities of Salem and Lynn, is conducting a study of the Route 107 corridor. This study is designed to address existing transportation issues and mitigate potential future impacts from new retail development along Route 107 from Chestnut Street in Lynn to Boston Street in Salem. Your input will help MassDOT evaluate proposed improvements.

Please mail this print survey back to the study team:

Route 107 Corridor Study Survey
Regina Villa Associates
51 Franklin St., Suite 400
Boston, MA 02110-1301

If you prefer, you can take the survey online: fluidsurveys.com/s/route107

Thank you for taking the time to complete this survey. For more information about the Route 107 Corridor Study, please visit the project website: **mass.gov/massdot/route107**



Do you live, work, or go to school in the Route 107 corridor (between Chestnut Street in Lynn and Boston Street in Salem)? (You may select more than one response.)

- ☐ I live in the corridor
- ☐ I work in the corridor
- ☐ I go to school in the corridor.
- ☐ I don't live, work, or go to school in the corridor

Do you own a business in the corridor?

- ○ Yes
- ○ No

When are you most likely to use Route 107 (from Chestnut Street in Lynn to Boston Street in Salem)? (Please only select one response.)

- ○ Weekday rush hours (between 7 AM - 9:30 AM or 4 PM - 7:30 PM)
- ○ Weekday non-rush hour
- ○ Weekends
- ○ Varies

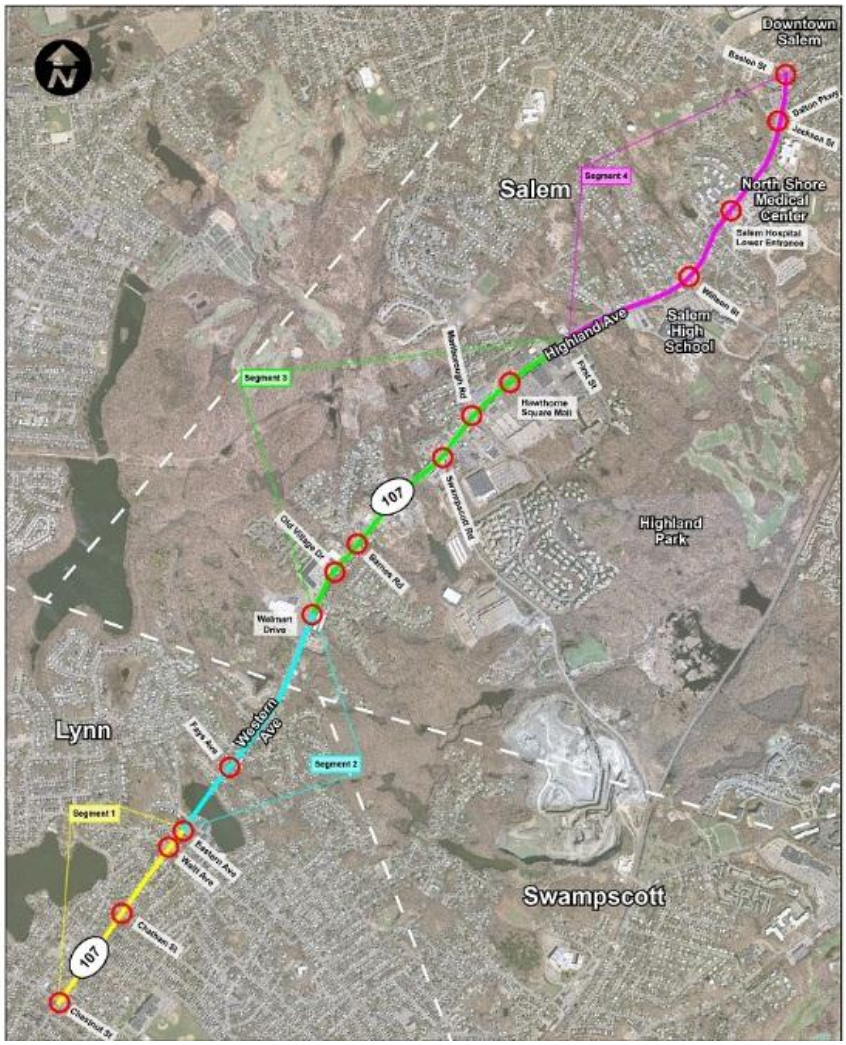
What are some of your typical area destinations? (You may select more than one response.)

- ☐ Collins Middle School
- ☐ North Shore Medical Center
- ☐ Salem High School/Nathaniel Bowditch School
- ☐ Hawthorne Square Mall Shopping Center
- ☐ Walmart
- ☐ Other, please specify... _____

How often do you drive a personal vehicle in the Route 107 area?

	Daily	Weekdays	Occasionally	Never
Commute to school	○	○	○	○
Commute to work	○	○	○	○
For recreation (community events, shopping, dining, errands)	○	○	○	○

How frequently do you experience traffic congestion in this area?



	Never	Rarely	Occasionally	Frequently	Usually
From Chestnut Street to Eastern Avenue (in Lynn)	○	○	○	○	○
From Eastern Avenue (in Lynn) to the Walmart (in Salem)	○	○	○	○	○
From the Walmart (in Salem) to Hawthorne Square Mall (First Street area)	○	○	○	○	○
From First Street to Boston Street (in Salem)	○	○	○	○	○

To what extent do you think safety improvements are needed in these parts of the corridor?

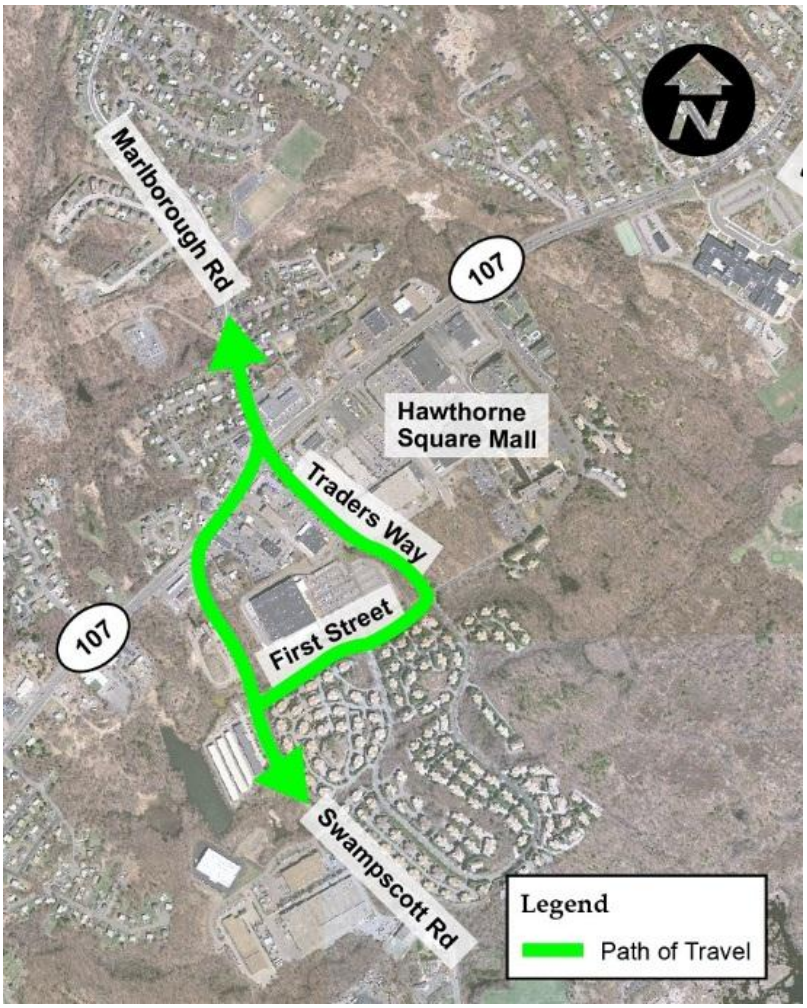
	Very little extent	Little extent	Some extent	Great extent	Very great extent
From Chestnut Street to Eastern Avenue (in Lynn)	○	○	○	○	○
From Eastern Avenue (in Lynn) to the Walmart (in Salem)	○	○	○	○	○
From the Walmart (in Salem) to Hawthorne Square Mall (First Street area)	○	○	○	○	○
First Street to Boston Street (in Salem)	○	○	○	○	○

What types of roadway improvements would you like to see in the Route 107 area?

	Very undesirable	Undesirable	Neutral	Desirable	Very desirable
More roundabouts	○	○	○	○	○
Addition of median islands	○	○	○	○	○
Speed bumps (to slow down motorists)	○	○	○	○	○
Right-in, right-out driveway access (no left turns in and out)	○	○	○	○	○
Sidewalk bump-outs (for traffic calming)	○	○	○	○	○
Left-turn lanes	○	○	○	○	○
Median separation with U-turn provisions	○	○	○	○	○

Are there other roadway improvements you would like to see?

Do you travel between Swampscott Road and Marlborough Road?



- ○ Yes, I travel on Swampscott Rd, Route 107 and Marlborough Rd. only.
- ○ Yes, I travel on Swampscott Rd., First Street, Traders Way and Marlborough Rd. only.
- ○ Yes, I use both routes.
- ○ No, I do not travel between these roads.

How often do you walk in the Route 107 area?

	Daily	Weekdays	Regularly	Rarely	Never
To get to public transit	○	○	○	○	○
Commute to school	○	○	○	○	○
Commute to work	○	○	○	○	○
For recreation (community events, shopping, dining, errands)	○	○	○	○	○

What distance are you comfortable walking for transportation purposes (not including fitness/leisure)?

- ○ Up to 1/4 mile (about 5 minutes)
- ○ Up to 1/2 mile (about 10 minutes)
- ○ Up to 1 mile (about 20 minutes)
- ○ More than 1 mile

What barriers keep you from walking short trips in the Route 107 area?

	Major obstacle	Minor obstacle	No obstacle
Walking areas too close to heavy traffic	○	○	○
Sidewalks/paths/crossing are in poor condition	○	○	○
Weather	○	○	○
Too dark when I travel	○	○	○
Concern about personal safety or security	○	○	○
Need to transport other people and things	○	○	○

What other barriers (if any) keep you from walking short trips in the corridor?

What improvements are needed to promote walking in the Route 107 area?

	Not at all Important	Somewhat Important	Important	Very Important
Longer WALK signals at crossings	○	○	○	○
More pedestrian crossings	○	○	○	○
Raised crosswalks	○	○	○	○
Pedestrian refuge islands at intersections	○	○	○	○
Better signs	○	○	○	○
Sidewalk bump-outs (to reduce pedestrian crossing widths)	○	○	○	○
Improved curb ramps and accessibility for people with disabilities	○	○	○	○
Slower traffic	○	○	○	○
More buffer between the sidewalk and vehicle traffic	○	○	○	○
Better lighting or security measures	○	○	○	○
Wider sidewalks	○	○	○	○
Better sidewalk maintenance (repair of infrastructure or removal of snow/debris)	○	○	○	○
Increased education and enforcement of pedestrian traffic laws	○	○	○	○
Shorter pedestrian crossing distances	○	○	○	○

How likely are you to walk in these segments of the corridor?

	Extremely unlikely	Unlikely	Neutral	Likely	Extremely likely
From Chestnut Street to Eastern Avenue (in Lynn)	○	○	○	○	○
From Eastern Avenue (in Lynn) to the Walmart (in Salem)	○	○	○	○	○
From the Walmart (in Salem) to Hawthorne Square Mall (First Street area)	○	○	○	○	○
First Street to Boston Street (in Salem)	○	○	○	○	○

How often do you take public transportation (buses) in the Route 107 corridor?

	Daily	Weekdays	Regularly	Rarely	Never
Commute to school	○	○	○	○	○
Commute to work	○	○	○	○	○
For recreation (community events, shopping, dining, errands)	○	○	○	○	○

What barriers keep you from using public transportation in this area?

	Major obstacle	Minor obstacle	No obstacle
Fare costs too much	○	○	○
It does not run often enough	○	○	○
It does not go where I want to go	○	○	○
It is too slow	○	○	○
Nearest stop is too far away	○	○	○
I do not feel safe walking to or waiting for it	○	○	○
I am uncomfortable in the vehicles	○	○	○
It is not as convenient as my personal vehicle	○	○	○
I make many stops during my trips	○	○	○
The service hours do not work with my schedule	○	○	○

What other barriers (if any) keep you from using public transportation in the corridor?

What is your level of comfort or confidence as a bicyclist?

- ○ I don't ride and have no plans to start.
- ○ Less confident - I only feel safe on separated paths (with few traffic crossings) and local streets.
- ○ Casual - I prefer separated paths but will ride on roads where space is available and traffic is manageable.
- ○ Experienced - I am confident and comfortable riding with traffic on the road in most situations.

How often do you ride a bike in the Route 107 area?

	Daily	Weekdays	Regularly	Rarely	Never
To get to public transit	○	○	○	○	○
Commute to school	○	○	○	○	○
Commute to work	○	○	○	○	○
For recreation (shopping, community events, dining)	○	○	○	○	○

What improvements are needed for you to bike in the Route 107 area?

	Not at all Important	Somewhat Important	Important	Very Important
More bike lanes	○	○	○	○
Off-road bike paths	○	○	○	○
Wider outside lanes (easier to share lane with cars)	○	○	○	○
Improved buffers between bicyclists and vehicles	○	○	○	○
Better bicycle parking and storage	○	○	○	○
More on-road bike signage (share the road signs/bike may use full lane signs)	○	○	○	○
Better bike accommodation through intersections (bike boxes)	○	○	○	○
Slower traffic	○	○	○	○
More and better bike route wayfinding signs and bike maps	○	○	○	○
Increased maintenance (street sweeping/repair of roads)	○	○	○	○
Increased enforcement of and education about traffic laws	○	○	○	○
Colored asphalt for bike lanes	○	○	○	○
Less traffic	○	○	○	○

What other improvements (if any) are needed for you to bike in the corridor?

How likely are you to bicycle these segments of the corridor?

	Extremely unlikely	Unlikely	Neutral	Likely	Extremely likely
From Chestnut Street to Eastern Avenue (in Lynn)	○	○	○	○	○
From Eastern Avenue (in Lynn) to the Walmart (in Salem)	○	○	○	○	○
From the Walmart (in Salem) to Hawthorne Square Mall (First Street area)	○	○	○	○	○
From First Street to Boston Street (in Salem)	○	○	○	○	○

What is the number one improvement you would like to see to in the Route 107 corridor?

The following demographic questions will allow MassDOT to better understand the makeup of residents, business owners, and other users of the corridor. It is optional to respond to these questions.

What is your age?

- ○ Under 18
- ○ 18 to 21
- ○ 22 to 34
- ○ 35 to 44
- ○ 45 to 64
- ○ 65 or over
- ○ Prefer not to say

Do you currently have a valid driver's license?

- ○ Yes
- ○ No

Do you have a private automobile (including light trucks) available for your use?

- ○ Yes, always
- ○ Sometimes (shared with household members)
- ○ Never

How do you self-identify by race? (Check all that apply.)

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or other Pacific Islander
- ☐ White
- ☐ Other (please specify) _____
- ☐ Prefer not to say

Are you Hispanic or Latino/Latina?

- ○ Yes
- ○ No
- ○ Prefer not to say

What is your current household income?

- ○ Less than $14,000
- ○ $14,000 to $27,999
- ○ $28,000 to $41,999
- ○ $42,000 to $69,999
- ○ $70,000 to $99,999
- ○ $100,000 to $139,999
- ○ $140,000 or more
- ○ Prefer not to say

In what language do you prefer to receive information about travel conditions or roadway projects?

- ○ English
- ○ Other, please specify... _____

Are you generally able to understand basic directions spoken or written in English?

- ○ Always
- ○ Often
- ○ Sometimes
- ○ Never
- ○ Prefer not to say

Online Survey
Spanish

Estudio del Corredor Route 107

Acerca de esta encuesta

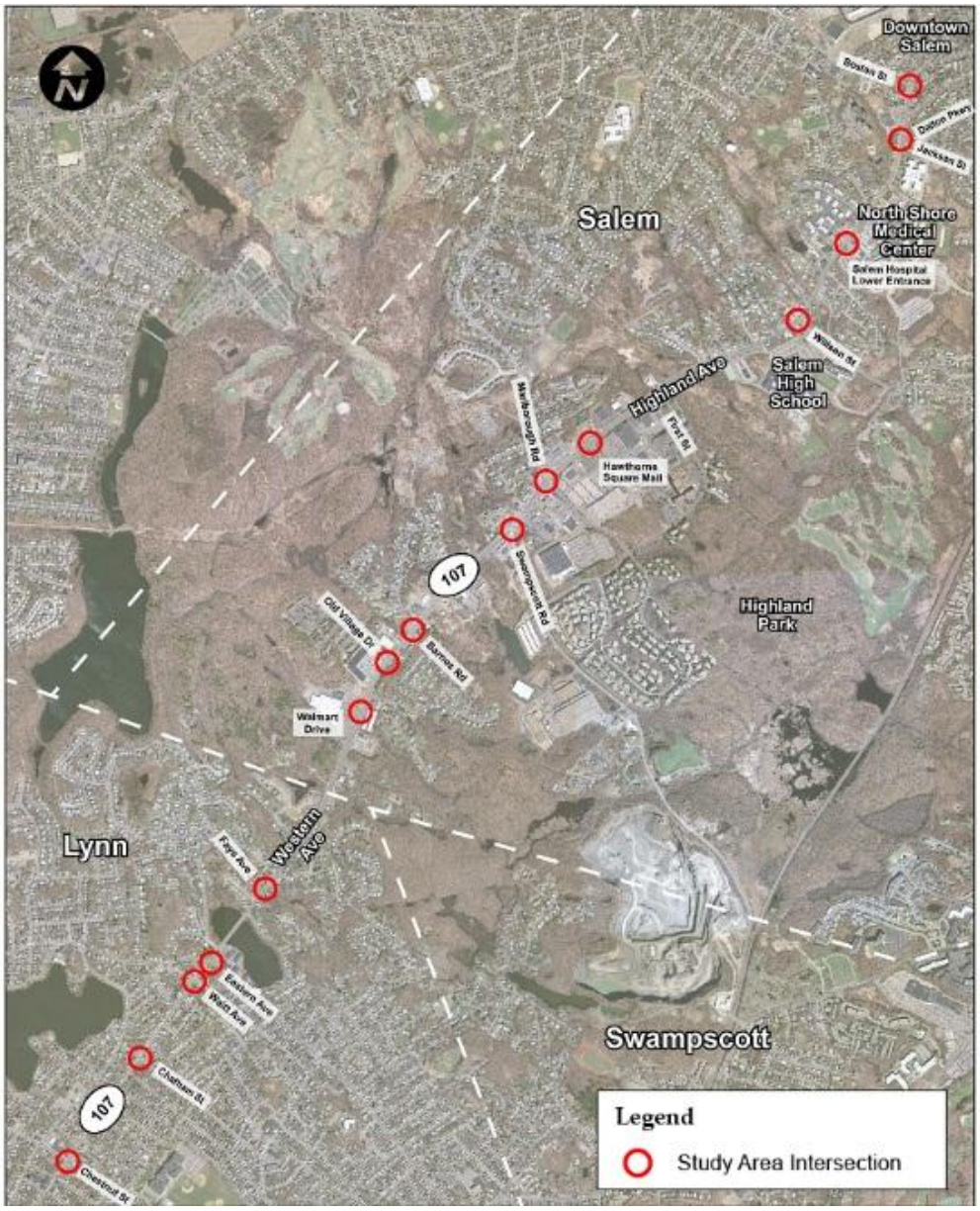
El Departamento de Transporte de Massachusetts (MassDOT), en coordinación con las ciudades de Salem y Lynn, está realizando un estudio del corredor Route 107. Este estudio se diseñó para resolver problemas de transporte actuales y mitigar posibles impactos futuros del desarrollo de espacios comerciales a lo largo de Route 107 desde Chestnut Street en Lynn hasta Boston Street en Salem. Su aporte ayudará a MassDOT a evaluar las propuestas para mejoras.

Puede enviarla esta encuestra de impression por correo a:

Route 107 Corridor Study Survey
Regina Villa Associates
51 Franklin St., Suite 400
Boston, MA 02110-1301

Si lo prefiere, también puede realizar la encuesta en línea: fluidsurveys.com/s/route107

Gracias por usar de su tiempo para llenar esta encuesta. Para más información sobre el Estudio del Corredor de Route 107, por favor visite el sitio web del proyecto: **mass.gov/massdot/route107**



¿Vive, trabaja o va a la escuela en el corredor Ruta 107 (entre Chestnut Street en Lynn y Boston Street en Salem)? (Puede seleccionar más de una respuesta.)

- ☐ Vivo en el corredor
- ☐ Trabajo en el corredor
- ☐ Voy a la escuela en el corredor
- ☐ Ni vivo, trabajo o voy a la escuela en el corredor

¿Es dueño de algún negocio en el corredor?

- ○ Sí
- ○ No

Generalmente, ¿cuándo es que usa Route 107 (de Chestnut Street en Lynn a Boston Street en Salem)? (Por favor seleccione sólo una respuesta.)

- ○ Días entre semana, en hora pico (rush, de 7 AM a 9:30 AM o de 4 PM a 7:30 PM)
- ○ Días entre semana, pero no en hora pico (no en hora rush)
- ○ Fines de semana
- ○ Varía

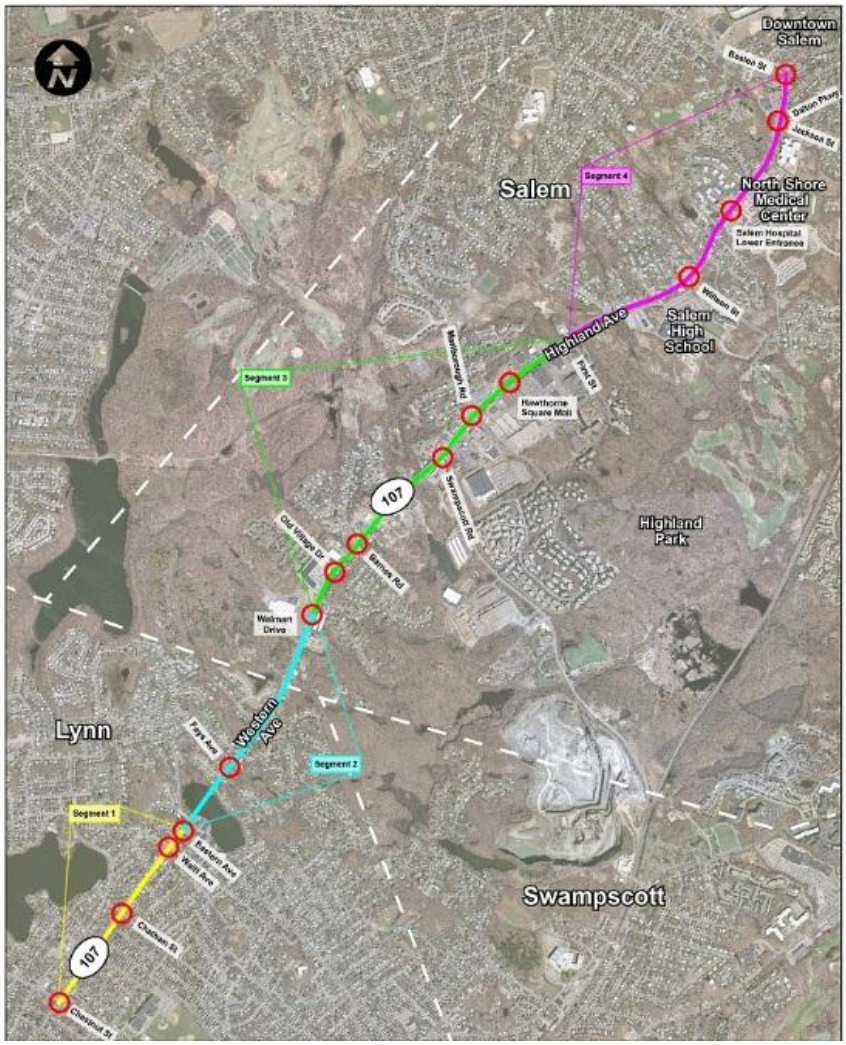
¿Cuáles son algunas de sus zonas de destino usuales? (Puede seleccionar más de una respuesta.)

- ☐ Collins Middle School
- ☐ North Shore Medical Center
- ☐ Salem High School/Nathaniel Bowditch School
- ☐ Hawthorne Square Mall Shopping Center
- ☐ Walmart
- ☐ Otra, por favor especifique... _____

¿Cuán frecuentemente guía un vehículo personal en la zona de Route 107?

	A diario	Entre semana	Ocasionalmente	Nunca
Ir y venir de la escuela	○	○	○	○
Ir y venir del trabajo	○	○	○	○
Fines recreativos (eventos comunitarios, compras, comidas, quehaceres)	○	○	○	○

¿Cuán frecuentemente encuentra congestión del tráfico en esta zona?



	Nunca	Rara vez	Ocasionalmente	Frecuentemente	Usualmente
De Chestnut Street a Eastern Avenue (en Lynn)	○	○	○	○	○
De Eastern Avenue (en Lynn) al Walmart (en Salem)	○	○	○	○	○
Del Walmart (en Salem) a Hawthorne Square Mall (zona First Street)	○	○	○	○	○
De First Street a Boston Street (en Salem)	○	○	○	○	○

¿En qué medida piensa que se necesitan mejoras a la seguridad en estas áreas del corredor?

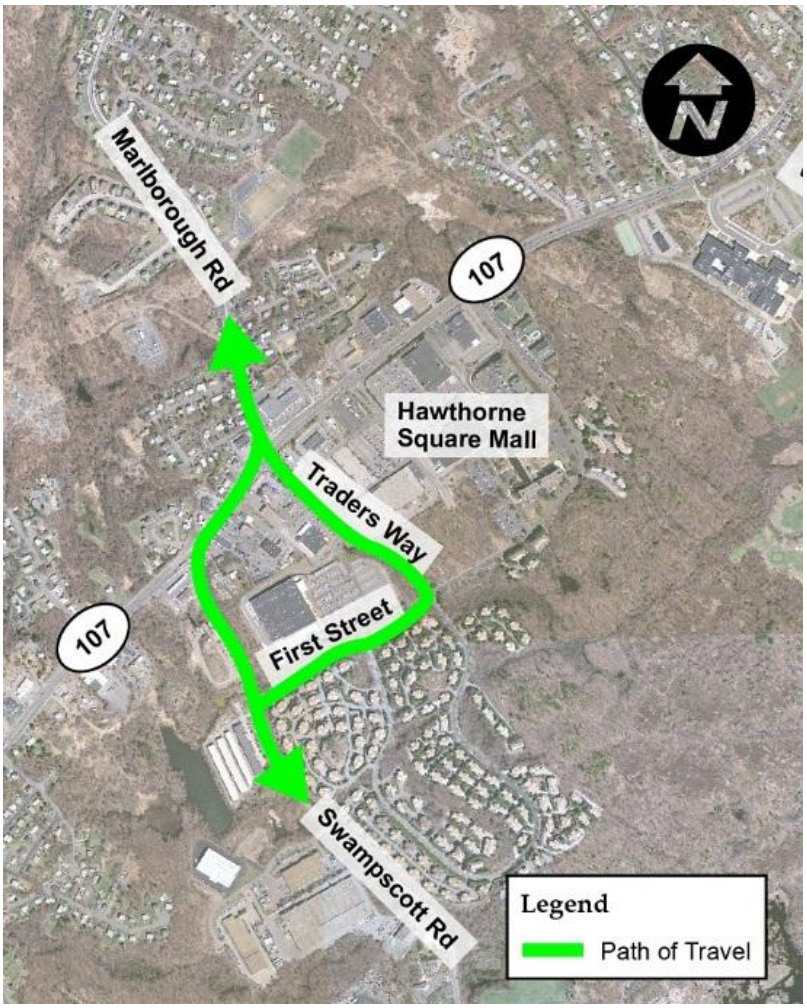
	Muy poca medida	Poca medida	Alguna medida	Gran medida	Muy gran medida
De Chestnut Street a Eastern Avenue (en Lynn)	○	○	○	○	○
De Eastern Avenue (en Lynn) al Walmart (en Salem)	○	○	○	○	○
Del Walmart (en Salem) a Hawthorne Square Mall (zona First Street)	○	○	○	○	○
De First Street a Boston Street (en Salem)	○	○	○	○	○

¿Qué tipos de mejoras a las carreteras le gustaría ver en la zona de Route 107?

	Muy indeseable	Indeseable	Neutral	Deseable	Muy deseable
Más rotondas	○	○	○	○	○
Adición de islas o medianas	○	○	○	○	○
Topes o muertos (para reducir la velocidad de los conductores)	○	○	○	○	○
Acceso por la derecha a calzada (sin giros a la izquierda)	○	○	○	○	○
Extensiones de aceras (para calmar el tráfico)	○	○	○	○	○
Carriles de giro a la izquierda	○	○	○	○	○
Separación de mediana con disposiciones para vueltas en U	○	○	○	○	○

¿Hay otras mejoras a las carreteras que le gustaría ver?

¿Viaja entre Swampscott Road y Marlborough Road?



- ○ Sí, viajo por Swampscott Rd, Route 107 y Marlborough Rd. solamente.
- ○ Sí, viajo por Swampscott Rd., First Street, Traders Way y Marlborough Rd. solamente.
- ○ Sí, uso ambas rutas.
- ○ No, no viajo entre esas carreteras.

¿Cuán frecuentemente camina en la zona de Route 107?

	A diario	Entre semana	Con regularidad	Rara vez	Nunca
Llegar hasta el transporte público	○	○	○	○	○
Ir y venir de la escuela	○	○	○	○	○
Ir y venir del trabajo	○	○	○	○	○
Fines recreativos (eventos comunitarios, compras, comidas, quehaceres)	○	○	○	○	○

¿Hasta qué distancia se sentiría cómodo/a caminando para fines de transporte (sin incluir gimnasio/recreación)?

- ○ Hasta 1/4 milla (alrededor de 5 minutos)
- ○ Hasta 1/2 milla (alrededor de 10 minutos)
- ○ Hasta 1 milla (alrededor de 20 minutos)
- ○ Más de 1 milla

¿Qué obstáculos le impiden hacer viajes cortos a pie en la zona de Route 107?

	Obstáculo grande	Obstáculo pequeño	No es obstáculo
Zonas para caminar muy cercanas al tráfico pesado	○	○	○
Aceras/senderos/cruces están en malas condiciones	○	○	○
Clima	○	○	○
Muy oscuro cuando viajo	○	○	○
Preocupación sobre la seguridad personal	○	○	○
Necesidad de transportar otras personas o cosas	○	○	○

¿Qué otros obstáculos (si los hay) le impiden hacer viajes cortos en el corredor?

¿Qué mejoras se necesitan para promover caminatas en la zona de Route 107?

	No tiene importancia	Tiene alguna importancia	Importante	Muy importante
Señales de WALK (camine) de más duración en los cruces	○	○	○	○
Más cruces peatonales	○	○	○	○
Cruces peatonales elevados	○	○	○	○
Islas de refugio para peatones en las intersecciones	○	○	○	○
Mejores señales	○	○	○	○
Extensiones de aceras (para reducir la distancia de cruces peatones)	○	○	○	○
Rampas de bordes mejoradas y accesibilidad para personas con discapacidades	○	○	○	○
Tráfico más lento	○	○	○	○
Más espacio de protección entre la acera y el tráfico vehicular	○	○	○	○
Mejor iluminación o medidas de seguridad	○	○	○	○
Aceras más anchas	○	○	○	○
Mejor mantenimiento de aceras (reparación de infraestructura o remoción de nieve/escombros)	○	○	○	○
Más educación y aplicación de las leyes de tráfico peatonal	○	○	○	○
Distancias más cortas para cruces peatonales	○	○	○	○

¿Cuán probable es que camine en estos segmentos del corredor?

	Sumamente improbable	Improbable	Neutral	Probable	Sumamente probable
De Chestnut Street a Eastern Avenue (en Lynn)	○	○	○	○	○
De Eastern Avenue (en Lynn) al Walmart (en Salem)	○	○	○	○	○
Del Walmart (en Salem) a Hawthorne Square Mall (zona First Street)	○	○	○	○	○
De First Street a Boston Street (en Salem)	○	○	○	○	○

¿Cuán frecuentemente usa transporte público (autobuses) en el corredor Route 107?

	A diario	Entre semana	Con regularidad	Rara vez	Nunca
Ir y venir de la escuela	○	○	○	○	○
Ir y venir del trabajo	○	○	○	○	○
Fines recreativos (eventos comunitarios, compras, comidas, quehaceres)	○	○	○	○	○

¿Qué obstáculos le impiden usar transporte público en esta zona?

	Obstáculo grande	Obstáculo pequeño	No es obstáculo
La tarifa o ticket cuesta demasiado	○	○	○
No corre con suficiente frecuencia	○	○	○
No va adonde yo quiero ir	○	○	○
Es demasiado lento	○	○	○
La parada más cercana queda demasiado lejos	○	○	○
No me siento seguro/a caminando o esperando	○	○	○
No siento comodidad en los vehículos	○	○	○
No me es tan conveniente como mi vehículo personal	○	○	○
Hago muchas paradas durante mis viajes	○	○	○
Las horas de servicio no cuadran con mi itinerario	○	○	○

¿Qué otros obstáculos (si los hay) le impiden usar transporte público en el corredor?

¿Qué nivel de comodidad o confianza tiene usando bicicletas?

- ○ No las uso y no tengo planes de comenzar a usarlas.
- ○ Menos confianza – Sólo me siento seguro/a en senderos aparte (con pocos cruces de tráficos) y calles locales.
- ○ Casual – Prefiero senderos aparte pero las usaré en carreteras con espacio disponible y donde el tráfico es manejable.
- ○ Más experiencia – Confío y me siento cómodo/a usándolas junto al tráfico en la carretera en la mayoría delas situaciones.

¿Cuán frecuentemente usa una bicicleta en la zona de Route 107?

	A diario	Entre semana	Con regularidad	Rara vez	Nunca
Llegar hasta el transporte público	○	○	○	○	○
Ir y venir de la escuela	○	○	○	○	○
Ir y venir del trabajo	○	○	○	○	○
Fines recreativos (eventos comunitarios, compras, comidas, quehaceres)	○	○	○	○	○

¿Qué mejoras se necesitan para que use bicicletas en la zona de Route 107?

	No tiene importancia	Tiene alguna importancia	Importante	Muy importante
Más carriles para bicicletas	○	○	○	○
Más senderos para bicicletas saliéndose de las carreteras	○	○	○	○
Carriles exteriores más anchos (más fácil compartir carril con autos)	○	○	○	○
Espacios de protección mejorados entre ciclistas y vehículos	○	○	○	○
Mejor estacionamiento y almacenamiento para bicicletas	○	○	○	○
Más señalización para bicicletas en la carretera (señales de compartir la carretera / señales de la bicicleta puede usar todo el carril)	○	○	○	○
Mejores arreglos para bicicletas en intersecciones (puntos de bicicletas)	○	○	○	○
Tráfico más lento	○	○	○	○
Más y mejores señales de orientación y mapas para ciclistas en la ruta de bicicletas	○	○	○	○
Aumento al mantenimiento (barrido de calles/reparación de carreteras)	○	○	○	○
Más educación y aplicación de las leyes de tráfico	○	○	○	○
Asfalto con colores para carriles de bicicletas	○	○	○	○
Menos tráfico	○	○	○	○

¿Qué otras mejoras (si las hay) se necesitan para que use bicicletas en el corredor?

¿Cuán probable es que use bicicletas en estos segmentos del corredor?

	Sumamente improbable	Improbable	Neutral	Probable	Sumamente probable
De Chestnut Street a Eastern Avenue (en Lynn)	○	○	○	○	○
De Eastern Avenue (en Lynn) al Walmart (en Salem)	○	○	○	○	○
Del Walmart (en Salem) a Hawthorne Square Mall (zona First Street)	○	○	○	○	○
De First Street a Boston Street (en Salem)	○	○	○	○	○

¿Cuál es la mejora número uno que le gustaría ver en el corredor de Route 107?

Las siguientes preguntas demográficas permitirán a MassDOT entender mejor la composición de los residentes, dueños de negocios y otros usuarios del corredor. Contestar estas preguntas es opcional.

¿Cuántos años tiene?

- ○ Menos de 18
- ○ 18 a 21
- ○ 22 a 34
- ○ 35 a 44
- ○ 45 a 64
- ○ 65 o más
- ○ Prefiero no decir

¿Tiene una licencia de conducir vigente en la actualidad?

- ○ Sí
- ○ No

¿Tiene un auto privado (incluyendo camiones ligeros) disponible para su uso?

- ○ Sí, siempre
- ○ A veces (compartido con miembros de la familia)
- ○ Nunca

¿Cómo se autoidentifica en términos de raza? (Marque todas las que apliquen.)

- ☐ India americana o nativa de Alaska
- ☐ Asiática
- ☐ Negra o afroamericana
- ☐ Nativa de Hawái o de otra isla del Pacífico
- ☐ Blanca
- ☐ Otra (por favor especifique) _____
- ☐ Prefiero no decir

¿Es hispano/hispana o latino/latina?

- ○ Sí
- ○ No
- ○ Prefiero no decir

¿Cuál es su ingreso familiar anual?

- ○ Menos de $14,000
- ○ $14,000 a $27,999
- ○ $28,000 a $41,999
- ○ $42,000 a $69,999
- ○ $70,000 a $99,999
- ○ $100,000 a $139,999
- ○ $140,000 o más
- ○ Prefiero no decir

¿En cuál idioma prefiere recibir información sobre las condiciones de viaje o proyectos de carreteras?

- ○ Inglés
- ○ Otro, por favor especifique... _____

Por lo general, ¿es capaz de entender instrucciones básicas habladas o escritas en inglés?

- ○ Siempre
- ○ Con frecuencia
- ○ A veces
- ○ Nunca
- ○ Prefiero no decir

Survey Results

Route 107 Corridor Study:
Online Survey Results

Introduction

The Massachusetts Department of Transportation (MassDOT), in coordination with the Cities of Salem and Lynn, is conducting a study of the Route 107 corridor. This study will propose improvements to address existing transportation issues for motorists, transit users, pedestrians, and bicyclists along Route 107 from Chestnut Street in Lynn to Boston Street in Salem.

Online Questionnaire

MassDOT developed an online survey to ask users to help identify issues and to recommend ideas related to improvements for transit users, motorists, pedestrians, and bicyclists. The survey was available in English and Spanish. It was made available through links publicized by email to the project database and Working Group, which includes representatives of employers, chambers of commerce, community groups, elected officials and more. The study team asked Working Group members to help distribute flyers to members of their organizations and others who may be interested.

On October 20, 2015 members of the study team distributed bilingual flyers to all residences, businesses, schools, and hospitals immediately abutting the Route 107 corridor. A media advisory was sent to local newspapers, including *The Daily Item, Salem Gazette, Salem News* and *Boston Globe North*. *The Patch* and *Boston Globe* featured articles describing the study and linking to the survey.

At the January 27, 2016 public meeting, the study team reminded participants to take the survey before it closed. The notifications and advertisements related to the public meeting also included a reminder about the survey.

The survey was available from October 14, 2015 to February 1, 2016. 1,672 people accessed the questionnaire, including two in Spanish. The top referrer sites[1] were a direct link to the survey (521), the MassDOT website (335), Facebook (237), a direct email from MassDOT (141), and links from media sources such as *Lynn Matters*, *The Patch*, *Salem News* and the *Boston Globe* (333).

While not all questions were completed in full by each respondent, the project team is confident that the results provide a helpful snapshot of travel habits, feedback on current conditions and suggestions to improve the corridor for multiple modes.

While the advantages of online surveys are that they save time and can provide access to a diverse group of individuals, sample issues can result. Demographic information provided by the respondent is self-reported, and the non-response rate is difficult to estimate. For example, the project team does not know how many people learned about the survey and chose not to complete

[1] A referrer is the webpage a respondent visited immediately before beginning the survey.

it. There is a self-selection bias in terms of who responds to the questionnaire; it is primarily people who already know about the project, those who regularly have contact with one of the referring sources, and those who have the time and inclination to participate. It is unlikely that a user of Route 107 without these project or community connections may even learn about the survey effort. Therefore, the results of the survey are not intended to be statistically significant, using scientific sampling methods. They do, on the other hand, provide insight into opinions of some of the users.

Who Are the Respondents?

The age of survey respondents is slightly older than the age group profile of the adult population of Essex County, based on the 2010 U.S. Census (see Table 1). Over 45% of respondents are between the ages of 45 and 64. 12% of respondents chose not to self-identify by race for the study. Among those who did self-identify, there were very few Asian (1%) or Black or African American (1%) respondents, compared to Essex County census population (Asian: 3%; Black or African American: 5%). According to the 2010 Census, 16.5% of people who live in Essex County identify as Hispanic. Only 3% of survey respondents identified as Hispanic. The median household income in Essex County is $67,311. While 26% of respondents chose not to disclose household income, only 34% had household incomes of $69,999 or less among those who responded.

Table 1: Respondent Age

Response	Chart	Percentage	Count
Under 18		0.4%	4
18 to 21		0.5%	5
22 to 34		15.2%	158
35 to 44		18.9%	196
45 to 64		46.8%	486
65 or over		16.0%	166
Prefer not to say		2.3%	24

Respondents were asked if they lived, worked and/or went to school in the Route 107 corridor. They were allowed to select more than one response. Almost half the respondents (47%) live in the corridor and 20% work in the corridor. Very few respondents (4%) go to school in the corridor.

Only 2% of the respondents (39) said they own a business in the Route 107 corridor.

Few respondents are transit-dependent; over 98% have a valid driver's license, and over 90% have a private automobile available to them.

When asked when they are most likely to use the corridor, the two most popular choices were weekday rush hours (41%) and "varies" (38%).[2] The most popular area destinations were Hawthorne Square Mall Shopping Center, North Shore Medical Center and Walmart.

74% of respondents use *both* the Swampscott Rd, Route 107 and Marlborough Road route and the Swampscott Rd., First Street, Traders Way and Marlborough Road route to travel between Swampscott Road and Marlborough Road (see Figure 1).

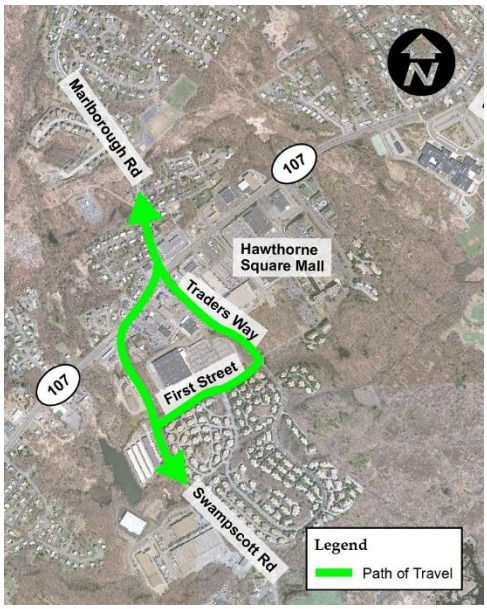


Figure 1: Path of Travel between Swampscott and Marlborough Roads

Driving

The majority of respondents drive personal vehicles in the corridor for recreation (events, shopping, dining and errands) at least occasionally (60%). About one-third of respondents (38%) use the corridor to commute to work daily, but another third (33%) report "never" using the corridor to commute to work.

Respondents were asked about how frequently they experienced congestion in the Route 107 corridor in a number of segments: from Chestnut Street to Eastern Avenue; from Eastern Avenue to the Walmart; from the Walmart to Hawthorne Square Mall (First Street area); and from First Street

[2] Respondents were able to select more than one response to this question.

to Boston Street. While a majority of respondents reported experiencing traffic congestion either "frequently" or "usually" for the segments from Eastern Avenue in Lynn all the way to Boston Street in Salem, these rates were generally higher for the Walmart to Hawthorne Square Mall (76%) and First Street to Boston Street segments (69%). Even the segment from Chestnut Street to Eastern Avenue in Lynn saw 41% of respondents experiencing congestion "frequently" or "usually."

Respondents were then asked about the extent to which safety improvements are needed in these segments of the corridor. A majority of respondents saw the need as a "great" or "very great" extent for the Walmart to Hawthorne Square Mall (66%) and First Street to Boston Street (60%) segments.

Respondents were also asked to share the type of roadway improvements that they would like to see in the Route 107 corridor (see Table 2). Of the listed potential improvements, a majority of respondents saw left-turn lanes (75%) and median separation with U-turn provisions (57%) as "desirable" or "very desirable."

Table 2: Desired Types of Roadway Improvements

	Very undesirable	Undesirable	Neutral	Desirable	Very desirable
More roundabouts	39.8%	21.6%	24.5%	7.7%	6.5%
Addition of median islands	16.9%	15.2%	38.1%	22.6%	7.2%
Speed bumps (to slow down motorists)	42.1%	26.5%	18.0%	7.9%	5.5%
Right-in, right-out driveway access (no left turns in and out)	12.9%	13.4%	29.0%	30.1%	14.6%
Sidewalk bump-outs (for traffic calming)	16.8%	16.0%	31.9%	24.0%	11.3%
Left-turn lanes	5.4%	3.8%	16.1%	39.6%	35.1%
Median separation with U-turn provisions	9.6%	8.4%	24.6%	35.2%	22.1%

Respondents were also given the opportunity in an open-ended question to share additional improvements they would make to the. Suggestions included:

- Improvements in traffic signal timing at a variety of intersections, including Eastern and Western Avenues
- Increasing the number of lanes/widening the roadway
- Repaving/repairing the roadway
- Reductions in development
- Enforcement of speed limits

Walking

Few respondents walk in the Route 107 area, and if they do, it is rarely to get to public transit, commute to school or commute to work. In fact, over 70% of all respondents "never" walk in the Route 107 area for these purposes, despite the fact that a majority report being comfortable walking for transportation purposes for up to ½ mile. While 43% of respondents "never" walk in the corridor for recreation purposes, some walk in the area regularly (20%) or daily (11%) for these purposes. Of all the segments of the corridor, respondents were most likely to walk between First Street and Boston Street, though 39% still say it was "extremely unlikely" that they walk there.

A majority of respondents report that the major barriers to walking short trips in the area are that the walking areas are too close to heavy traffic (68%), the sidewalks/paths/crossings are in poor condition (62%), and there is a concern about personal safety or security (53%).

Respondents were also encouraged to share other barriers to walking in the corridor as part of an open-ended question. Barriers included:

- Crossings are too few and inconvenient
- Not enough sidewalks
- Sidewalks are not maintained/cleared of snow
- Failure to enforce laws to protect pedestrians from traffic

To overcome the barriers, respondents favored a number of improvements including more pedestrian crossings, pedestrian refuge islands at intersections, improvements to curb ramps and accessibility for people with disabilities, more buffer between the sidewalk and vehicle traffic, better lighting or security measures, wider sidewalks and better sidewalk maintenance (see Table 3).

Table 3: Improvements to Promote Walking

	Not at all Important	Somewhat Important	Important	Very Important
Longer WALK signals at crossings	24.6%	32.8%	25.3%	17.3%
More pedestrian crossings	16.8%	30.1%	30.5%	22.6%
Raised crosswalks	31.9%	26.6%	24.5%	17.1%
Pedestrian refuge islands at intersections	14.6%	28.3%	36.2%	20.8%
Better signs	13.3%	22.4%	35.9%	28.4%
Sidewalk bump-outs (to reduce pedestrian crossing widths)	30.7%	31.1%	24.7%	13.5%
Improved curb ramps and accessibility for people with disabilities	12.6%	20.9%	34.0%	32.6%
Slower traffic	23.6%	25.7%	24.5%	26.2%
More buffer between the sidewalk and vehicle traffic	14.3%	22.7%	30.2%	32.7%
Better lighting or security measures	10.7%	17.2%	32.8%	39.3%
Wider sidewalks	16.9%	23.6%	30.5%	29.0%
Better sidewalk maintenance (repair of infrastructure or removal of snow/debris)	7.2%	10.3%	29.7%	52.8%
Increased education and enforcement of pedestrian traffic laws	15.2%	24.5%	28.0%	32.4%
Shorter pedestrian crossing distances	21.7%	31.3%	28.8%	18.2%

Public Transportation

Very few respondents are regular users of public transportation in the Route 107 corridor, regardless of trip purpose. If respondents did take public transportation, even "rarely," it tended to be for recreation. Even for that trip purpose, 76% of respondents reported "never" using public transportation in the corridor.

A majority of respondents reported that the major barrier to using public transportation in the corridor is that it is not as convenient as using the personal vehicle. As noted earlier, the respondents to this survey are generally not transit-dependent and appear to want to use personal vehicles as a matter of choice. Issues of schedule and routing do not seem to have an effect on the reasons respondents choose to use personal vehicles.

Respondents were also encouraged to share other barriers to using public transportation in the corridor as part of an open-ended question. Barriers included:

- Lack of information (location of stops, schedule, fares)
- Unreliability of service
- Infrequent service/no service to Boston on weekends
- Lack of amenities (benches, shelters) at bus stops

Bicycling

Over 90% of respondents report "never" using a bicycle to get to public transit, commute to school or commute to work. About three-quarters of respondents (77%) report "never" using a bicycle for recreation either. This is true for users in all segments of the corridor, though users are less likely to bike in the segments from Chestnut Street in Lynn to the Walmart in Salem. While half the respondents (50%) report that they do not ride bikes and have no plans to start, about 30% report that they are "casual" or "experienced" bicycle users.

Respondents were asked about what improvements would be needed to bike in the Route 107 corridor (see Table 4). Of the listed improvements, off-road bike paths, improved buffers between bicyclists and vehicles, increased maintenance, and less traffic were seen as the most important.

Respondents were also encouraged to share other improvements that could be made as part of an open-ended question. Many respondents in this section said that bikes should not be allowed on the roadway in general. Suggestions for improvements included:

- Protected lanes
- Protectedintersections (including bike boxes)
- Reduction in traffic speed

Table 4: Improvements Needed for Biking

	Not at all Important	Somewhat Important	Important	Very Important
More bike lanes	36.5%	17.6%	17.9%	28.0%
Off-road bike paths	31.0%	14.3%	18.1%	36.6%
Wider outside lanes (easier to share lane with cars)	37.2%	17.8%	20.5%	24.5%
Improved buffers between bicyclists and vehicles	31.1%	13.0%	20.5%	35.4%
Better bicycle parking and storage	40.7%	19.4%	19.3%	20.6%
More on-road bike signage (share the road signs/bike may use full lane signs)	36.3%	20.4%	19.2%	24.1%
Better bike accommodation through intersections (bike boxes)	35.9%	18.1%	21.8%	24.1%
Slower traffic	39.0%	19.0%	19.9%	22.0%
More and better bike route wayfinding signs and bike maps	36.7%	21.1%	20.5%	21.7%
Increased maintenance (street sweeping/repair of roads)	27.9%	13.5%	21.4%	37.2%
Increased enforcement of and education about traffic laws	30.9%	15.3%	22.0%	31.8%
Colored asphalt for bike lanes	35.3%	18.3%	22.2%	24.1%
Less traffic	33.1%	17.7%	19.0%	30.2%

Other Comments

Respondents were also asked to name the number one improvement they would make to the Route 107 Corridor. Improvements included the following:

- Reducing traffic
- Improving left-hand turns
- Retiming light signals
- Repaving the roadway/fixing potholes
- Restriping the roadway for better lane/turning movements
- Adding sidewalks
- Adding bike lanes
- Better roadway maintenance

The word cloud below (see Figure 2) is comprised of the open-ended responses to this question. The word cloud demonstrates that traffic is the issue that overwhelmingly dominant in all of the open-ended responses.

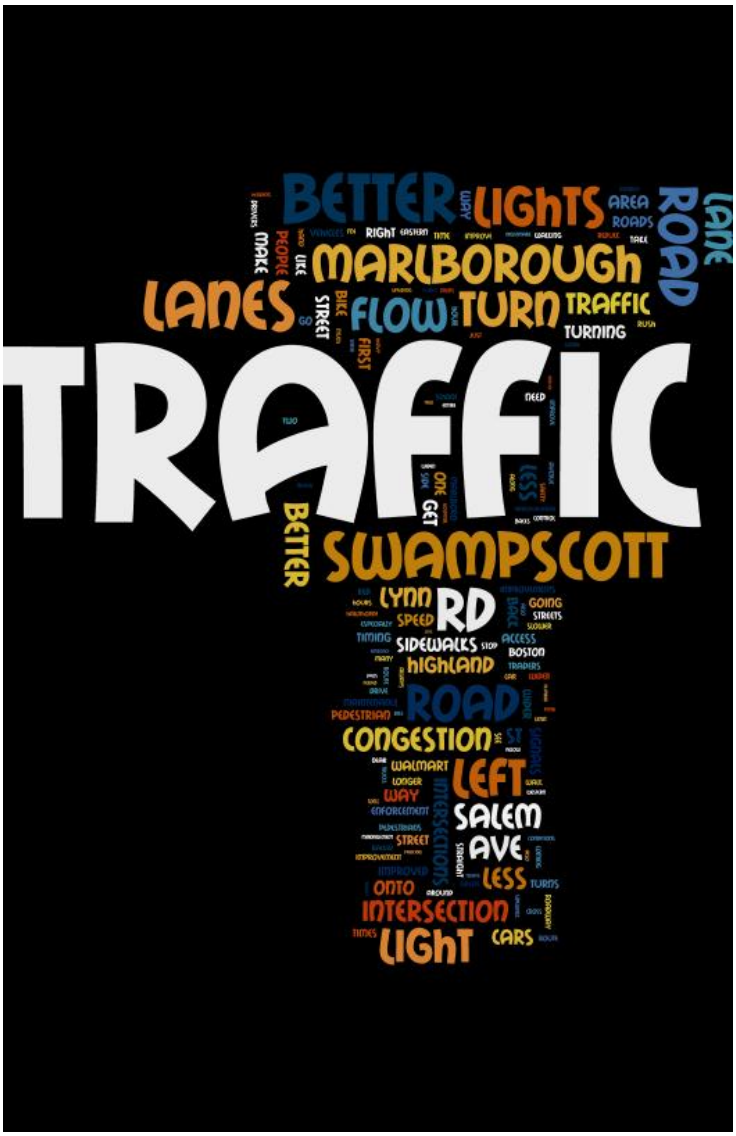


Figure 2: Word Cloud of Suggested Improvements

Conclusion

The results of the online survey are consistent with the data gathered during the study's existing conditions analysis. The answers to multiple choice questions and extensive written responses to open ended questions provide illumination and detail that support the technical analysis completed to date. MassDOT will consider the responses regarding preferred improvements as the project progresses to the alternatives development phase.

APPENDIX B

Working Group

Working Group Meeting #1 Summary

Route 107 Corridor Study Working Group Meeting #1: Summary

June 10, 2015, 10:00 AM, Salem City Hall Annex, 120 Washington Street, Salem, MA

Purpose

The kickoff meeting for the Route 107 Corridor Study Working Group will provide an opportunity for working group members to meet one another, for MassDOT to provide an introduction to the study, and for the design team to present data from field reconnaissance and data collection efforts.

Handouts

Meeting agenda with contact information and website

Present

Michael Clark and Ethan Britland, Massachusetts Department of Transportation (MassDOT) Office of Transportation Planning (OTP); Maureen Chlebek, Jason Adams, and Joanne Haracz, McMahon Associates; Sarah Paritsky, Regina Villa Associates; and the following members of the Working Group:

Shelly Bisegna, North Shore Medical Center
Bill Bochnak, Economic Development & Industrial Corporation (EDIC) Lynn
Beth Debski, The Salem Partnership
Patrick Delulis, Salem and Lynn Area Chamber of Commerce
Lynn Duncan, City of Salem, Department of Planning and Community Development
Jeff Elie, Salem Bicycling Advisory Committee
David Eppley, Salem City Council
Leslie Gould, Lynn Area Chamber of Commerce
Andrew Hall, City of Lynn, Department of Public Works
Meaghan Hamill, Office of Senator McGee
Chris Kuschel, Metropolitan Area Planning Council (MAPC)
Senator Joan Lovely, State of Massachusetts
Senator Thomas McGee, State of Massachusetts
John Olson, Lynn Area Chamber of Commerce
Rinus Oosthoek, Salem Chamber of Commerce
John Pelletier, Salem Mass in Motion Program Coalition
Lt. Robert Preczewski, Salem Police Department
Sgt. Ned Shinnick, Lynn Police Department
Jonathan Thibault, Lynn Housing Authority & Neighborhood Development
Representative Paul Tucker, State of Massachusetts
Jeff Weeden, Lynn Housing Authority & Neighborhood Development
Dale Yale, Salem Planning Board
Giovanna Zabaleta, City of Salem

Meeting Summary

MassDOT Project Manager Michael Clark opened the meeting, reviewed the agenda, and led a round of introductions. Mr. Clark introduced the study consultant team of McMahon Associates and Regina Villa

Associates (RVA). Mr. Clark reviewed the corridor map and pointed out the ten intersections that will be highlighted during the study, two of which are within the Top 200 Crash Locations in the state.

Mr. Clark described the purpose of the study, which will include an evaluation of multimodal improvements to accommodate new retail and other future impacts possible along the corridor. The study aims to resolve traffic delays, queuing, signal design, and other issues and will recommend short, medium, and long term improvements based on an alternatives analysis.

The study consists of six tasks and the project team is currently in Task 2: Perform Field Reconnaissance and Collect/Gather Information. Feedback collected at this meeting will be incorporated into subsequent tasks. Mr. Clark provided an overview of the Public Involvement Plan, which will consist of four Working Group meetings and two public meetings. The study is expected to wrap up by spring 2016.

Mr. Clark explained the roles of the Working Group and encouraged members to let him know if anything is missing and whether the data presented at this meeting is consistent with members' experiences and observations. Mr. Clark described the draft goals, objectives and evaluation criteria before handing the presentation over to Maureen Chlebek, McMahon Project Manager.

Ms. Chlebek shared the data collection efforts completed and transportation conditions identified to date. Several public transportation options are offered in the region, and the roadway is mostly owned by MassDOT with a portion owned by the City of Lynn. Field reviews were conducted throughout the entire corridor during peak periods (weekday mornings and afternoons, and Saturday afternoons). Traffic counts were taken at the end of March and in early April 2015. McMahon conducted an origin/destination study to better understand the area where Route 107 meets Swampscott Road and Marlborough Road.

Ms. Chlebek explained that Route 107 is a vehicle-dominant roadway and therefore has relatively low counts of pedestrians and bicyclists. At best, bicycles can ride on a four foot wide shoulder without obstructions, and at worst a five foot wide shoulder with obstructions. The study will seek to improve bicycle accommodations for the corridor. Sidewalks line most of the corridor, but there are missing pieces, particularly on the west side of the street, and much of the existing sidewalks are in poor condition and lack compliance with the Americans with Disabilities Act (ADA).

Jason Adams provided an overview of existing traffic conditions and automatic traffic recorder (ATR) counts along the corridor. Approximately 30,000 to 35,000 vehicles drive on Route 107 on a daily basis. The speed limit is generally 35 miles per hour (MPH), increasing to 45 MPH between Walmart and Swampscott Road. Turning movement counts were taken at the ten primary intersections on weekdays and Saturdays. The results largely indicate that Route 107 is both a destination and commuter corridor.

Mr. Adams described bicycle and pedestrian count results in the corridor. There was very little bicycle activity, which does not necessarily indicate a lack of desire; rather the condition of bicycle accommodations may discourage bicycle activity. The highest pedestrian counts were taken near the schools on weekday mornings, and near Marlborough Road and the Hawthorne Square Mall on weekday and Saturday afternoons near the busiest bus stops.

Mr. Adams presented the results of the origin/destination data for traffic taking a right onto Route 107 from Swampscott Road and then taking a left onto Marlborough Road. Traffic making this movement makes up about 14% of the total northbound Route 107 traffic in this location. Traffic making the

reverse movement (turning right on Route 107 from Marlborough Road then turning left on Swampscott Road) makes up about 12% of the total southbound Route 107 traffic.

Mr. Adams shared the crash analysis results. He focused on two of the top crash intersections: Eastern Avenue in Lynn (well above the state signalized crash rate) and Marlborough Road in Salem (slightly above the state signalized crash rate).

Joanne Haracz reviewed transit conditions throughout the Route 107 corridor. Almost 1600 riders take the MBTA Bus Route 450 per day on weekdays, while only 275 riders take the MBTA Bus Route 456 daily since it offers less frequent service. There are 18 pairs of inbound/outbound bus stops throughout the corridor, with five of these bus stops serving the bulk of the ridership in the area.

Ms. Haracz described existing land use in Lynn (primarily residential) and Salem (a mix of commercial/retail, industrial, and residential). Zoning is consistent in each city. Salem has an Entrance Corridor Overlay District within 150 feet from the roadway centerlines for much of the corridor.

Ms. Haracz noted there are some social equity issues with regards to Environmental Justice populations, as defined by the Boston Region Metropolitan Planning Organization. There are also environmental and historic resources, including protected lands and several historic properties, within the study area.

Ms. Chlebek said the next steps are for the project team to finish Task 2 and move into Task 3. Mr. Clark noted the presentation will be posted to the project website.

Question & Answer Session

Mr. Clark welcomed questions from the Working Group.

Question: Is there an opportunity to expand the study area to include Boston Street and North Shore Medical Center in Salem, and Chestnut Street in Lynn? Mr. Clark said he will look into this possibility, and at the very least incorporate qualitative feedback into the study and consider regional traffic impacts. Representative Paul Tucker later agreed that it is critical to encompass Boston Street.

Question from Representative Tucker: Will the study consider the proposed Cinema World complex that could have dramatic traffic effects? Mr. Clark said the study will examine special generators for future growth rates, and coordination with the cities will ensure major projects like the Cinema World complex are considered.

Comments from Senator Joan Lovely: North Shore Medical Center is considering a new route for emergency vehicles. She receives many phone calls from constituents about traffic on Route 107 from the south to the northern ends. Many drivers need to turn around on residential streets in order to access businesses on the other side of the road and median. This corridor impacts residents' quality of life and the community really cares about these issues. Mr. Clark thanked Senator Lovely for her comments and took note of them.

Question from Senator Thomas McGee: Does the study include an analysis of the entire Route 107 corridor for commuters? There are broader bike and transit issues that could have long-term possibilities. Ms. Chlebek said the study does consider the broader regional context. Mr. Clark added that MassDOT District 4 and the highway team are involved to ensure the study is considering the regional perspective.

Question from Shelly Bisegna, North Shore Medical Center: Did the study team collect information on the wait times at the Willson Street/Cherry Hill Avenue intersection? This intersection gets backed up during hospital shift changes and when the middle and high schools end for the day. Ms. Chlebek said her team will look at the wait time at intersections.

Comments from John Olson, Lynn Area Chamber of Commerce: The intersection of Eastern Avenue and Stanwood is an unsignalized intersection that keeps the traffic moving. A signal would only cause further traffic issues. Ms. Chlebek made a note of this suggestion.

Comments from Sgt. Ned Shinnick, Lynn Police Department: There are east/west traffic issues at Eastern Avenue as well. Ms. Chlebek noted this issue.

Comments and Questions from David Eppley, Salem City Council: There are two small communities near Barnes Road and Ravenna that are very quiet. The community is concerned with the proposed Cinema World complex, and some people think any development on Highland Avenue is bad. When will outreach be done to smaller communities and condo associations? There is concern about takings if there is not sufficient room to expand. Mr. Clark noted these concerns. Ms. Chlebek added that the project team is looking at land use, economic development, and solutions for all stakeholders. Residents and business owners have similar goals – to reduce congestion and improve the corridor. Lynn Duncan, City of Salem, added that the City will work with McMahon and RVA to partner on public outreach. Sarah Paritsky, RVA, added that interested members of the public can sign up for email updates on the Route 107 Corridor Study website. The project team will send emails to announce project updates and upcoming public meetings.

Comments from Beth Debski, The Salem Partnership: The study should analyze the intersection of High Street and First Street, as well as the signal at Traders Way. Ms. Chlebek agreed that motorists zig-zag in several locations, and consideration of these intersections has been observed.

Comments from Patrick DeIulis, Salem and Lynn Area Chamber of Commerce: The study should explore opportunities for trial implementations, such as striping or signal modifications. Ms. Chlebek said the study will make short, medium, and long term recommendations and we can consider pilot programs to test out ideas. Mr. Clark added that tactical improvements and any pressing issues could be handled in a timely manner.

Comments: The MBTA data may include errors due to monthly pass users and others who enter through the back door of the bus. Ms. Haracz explained the ridership data is less important than identifying which bus stops are the most utilized within the corridor.

Comments from Chris Kuschel, MAPC: Zoning can change over time, so please keep that in mind. Ms. Haracz said the next step is for the project team to talk to the cities about any developments or zoning changes that are planned.

Comments: A new signal is needed between Sunset Road and Barnes Road for left turns. Ms. Chlebek noted this suggestion.

Comments from Senator Lovely: Will the study track the application process for the Cinema World complex with the Planning Board and consider traffic mitigation? Mr. Clark and Ms. Chlebek confirmed the team will track the process. Ms. Duncan said the Salem Planning Board will look at the traffic

mitigation study and hire a third party traffic engineer to review the proposed traffic mitigation study. She will refer that traffic engineer to McMahon for coordination. Ethan Britland, MassDOT OTP, noted that all public/private developments like the Cinema World complex will need to submit a Massachusetts Environmental Policy Act (MEPA) document if it's expected to be a significant trip generator. This will be included in the study as a future no-build alternative.

Comments: When Columbia Road is backed up it can lock people in their neighborhoods. Congestion relief is needed here. In order to encourage flow, perhaps a roundabout could be considered in certain locations. Ms. Chlebek took note of these suggestions.

Comments from Sgt. Shinnick: There are several other intersections in the vicinity that are in the top 200 for crashes. The police departments are adding enforcement to improve safety but there is a need for additional safety improvements. Ms. Chlebek took note of this concern.

Question: Will ATR counts be taken in October, as that is the busiest time, particularly on the weekends, for tourism in Salem? Ms. Chlebek said the ATRs were taken in the spring but they will consider seasonal weekend traffic.

Comment: Is the center guard rail needed? It is an impediment to traffic flow and transit users who are accessing the food pantry need to walk far to cross the street. Ms. Chlebek took note of this concern and said cross connections are important.

Comments from Jeff Elie, Salem Bicycling Advisory Committee: Salem State University is transitioning from a commuter campus to a more residential campus. Consider students who may want to access the businesses along Route 107 via bike, walking and transit. Also, a comprehensive bike update is in progress with the City of Salem. Ms. Chlebek thanked Mr. Elie for the suggestion.

Question: From the Floating Bridge to Walmart, the roadway is one lane each way (formerly 2 lanes each way). Can the study consider changes at Buchanan Circle and Belleaire? Ms. Chlebek said her team will look at the number of lanes, volumes, and other changes.

Question from Ms. Duncan: After the study, can MassDOT commit to the design and construction? Mr. Clark explained that transportation projects follow a certain funding process that can be lengthy, which is why some recommendations will be short-term and can be implemented more quickly and easily. He noted that the intention of the study is to produce action items which MassDOT hopes to be able to act upon.

Question from Ms. Duncan: When is the next Working Group Meeting? Mr. Clark said the next Working Group meeting will be scheduled in late summer after Task 3 is completed. When asked about involving the public sooner, Ms. Chlebek said the public will have an opportunity to react to the data collection and analysis, before the team develops alternatives.

Mr. Clark thanked the Working Group for attending the meeting.

Working Group Meeting #2 Summary

Route 107 Corridor Study Working Group Meeting #2: Summary

October 20, 2015, 10:00 AM, Salem City Hall Annex, 120 Washington Street, Salem, MA

Purpose

At the second Working Group meeting for Route 107 Corridor Study, MassDOT and its consultant team provided an update on Task 2, field reconnaissance and data collection, given the recent expansion of the study area. The team also presented its findings under Task 3, evaluation of existing conditions and identification of transportation issues.

Present

Ethan Britland and Michael Clark, Massachusetts Department of Transportation (MassDOT) Office of Transportation Planning (OTP); Maureen Chlebek and Jason Adams, McMahon Associates; Sarah Paritsky and Emily Christin, Regina Villa Associates (RVA); and the following members of the Working Group:

Shelly Bisegna, North Shore Medical Center
Beth Debski, The Salem Partnership
Patrick Delulis, Salem and Lynn Area Chamber of Commerce
Lynn Duncan, City of Salem, Department of Planning and Community Development
David Eppley, Salem City Council
Brian Francis, MBTA
Leslie Gould, Lynn Area Chamber of Commerce
Andrew Hall, City of Lynn, Department of Public Works
Meaghan Hamill, Office of Senator McGee
David Knowlton, City of Salem
Chris Kuschel, Metropolitan Area Planning Council (MAPC)
Andrea Leary, North Shore TMA
Senator Joan Lovely, State of Massachusetts
Stephen Lovely, Lovely Law Group LLP
Adi Nochur, Walk Boston
Rinus Oosthoek, Salem Chamber of Commerce
John Pelletier, Salem Mass in Motion Program Coalition
Lt. Robert Preczewski, Salem Police Department
Connie Raphael, MassDOT
Sgt. Ned Shinnick, Lynn Police Department
Jason Silva, City of Salem
Sara Timoner, MassDOT
Representative Paul Tucker, State of Massachusetts
Dale Yale, Salem Planning Board
Giovanna Zabaleta, City of Salem

Meeting Summary

Welcome, Introductions, and Study Process

MassDOT Project Manager Michael Clark opened the meeting, reviewed the agenda, and led a round of introductions. Mr. Clark introduced the study consultant team of McMahon Associates and RVA.

Mr. Clark noted that Tasks 2 and 3 will be discussed at this meeting, and Task 4 will be covered at the next Working Group meeting in two to three months. There will be a final report at the end of the study that summarizes all of the tasks.

Mr. Clark reviewed the study schedule, and noted that the study has progressed to the end of Task 3.

Mr. Clark announced that the online survey is now live and was sent out to the Working Group last week. The team hopes to get a lot of feedback from the Working Group and the public at large. Mr. Clark encouraged the members of the Working Group to share the survey with their organizations' members, constituents, and anyone else who may be interested. The survey will be live for a few months, through the first public meeting. Mr. Clark introduced Maureen Chlebek, McMahon Associates Project Manager, to discuss the study area.

Expanded Study Area

Ms. Chlebek thanked the Working Group for providing feedback at the first meeting in June, which later resulted in a decision by MassDOT to expand the study area. She showed a map of the original project limits from Willson Street in Salem to Maple Street in Lynn. She then showed a map of the new project limits, which includes the following five new intersections:

- Route 107 at Chestnut Street, Lynn
- Route 107 at Chatham Street, Lynn
- Route 107 at the lower entrance to Salem Hospital, Salem
- Route 107 at Jackson Street/Dalton Parkway, Salem, and
- Route 107 at Boston Street, Salem.

The team has gathered data on these new intersections as part of Task 2. Ms. Chlebek explained that the new intersections fall under city jurisdiction, whereas the original study area intersections are under MassDOT jurisdiction.

Ms. Chlebek reviewed the results of the Existing Traffic Conditions data collection:

- The team collected automatic traffic recorder (ATR) counts at five new locations and collected manual turning movement counts (MTMCs) during the weekday AM and PM peak hours and Saturday peak hours at the new intersections within the study area. Turning movement counts at the five new intersections showed relatively similar traffic volumes, except for a drop in volumes at the extremities of the corridor.
- Bicycle counts were recorded at the new intersections and found to be very low, similar to the original study area's intersections. This is likely due to lack of amenities for bicyclists.
- The new intersections had higher pedestrian peak hour volumes than the original study area's intersections. This is likely due to the fact that the new northern intersections are close to downtown Salem.
- Intersection crash rates were compared to the MassDOT average crash rates. Five out of the 15 intersections have a crash rate higher than the MassDOT average. Ms. Chlebek shared maps with crash analysis data, including the number of crashes and those that resulted in personal injury. Three of the new intersections are on the list of the top 200 crash rate intersections in the state. Crash diagrams were also composed to look at patterns of crashes.

Ms. Chlebek shared results of the Existing Transit Conditions data collection:

- The expanded study area includes a new MBTA bus route, Route 424, in addition to the two bus routes observed in the original study area (Routes 450 and 456). Ms. Chlebek showed a map of the bus stops along the study corridor, and pointed out the top five stop pairs that have the highest ridership. A stop pair includes a bus stop on each side of the street near the same location.

Ms. Chlebek shared a map of the land use and zoning in and around the study area. She noted that it is important to not just study the land use adjacent to the study corridor but also around it. Ms. Chlebek also shared maps of environmental resources and environmental justice areas that must be treated fairly and not overlooked. Ms. Chlebek showed a map of the cultural and historic resources in the study area. The project team must be sensitive to historic resources in the area, many of which are near downtown Salem.

Traffic Operations

Ms. Chlebek shared a map of the Level of Service (LOS) for each intersection along the corridor. The LOS provides an indication of delay at the intersection and varies from a grade of A (good) through F (poor). It is typical to design for a LOS of D and avoid E or F. Many intersections experience a LOS of E or F and require improvements to their operations. Ms. Chlebek stressed that the LOS is only one tool for observing the area and does not tell the whole story.

Transportation Issues/Deficiencies

Ms. Chlebek presented the team's findings on transportation deficiencies throughout the study area. She noted that while the team has walked along the corridor and collected data, the Working Group's input on issues and deficiencies is important given that they use and experience the corridor on a more frequent basis. Ms. Chlebek presented findings on transit deficiencies:

- There is low bus ridership along the corridor and many stops with insufficient spacing. There are four bus stops that do not have a stop pair, which makes it difficult for riders who want to take the bus in both directions near the same location.
- The connections and access to the bus stops are lacking throughout the corridor. The median guardrails pose a significant barrier for pedestrians to connect between stops. In other locations, there are insufficient sidewalks and/or crosswalks.
- There are several stops that do not have adequate space for the bus to safely pull up without blocking traffic.

Jason Adams, McMahon Associates, presented findings on pedestrian deficiencies throughout the corridor:

- There are many sections of sidewalk with inadequate width and no clear definition between the sidewalk and the roadway.
- Other issues include the median barriers (obstructing crossing activity or missing entirely to not serve as a refuge), missing curb ramps, faded or missing crosswalks, and poor signage.

Mr. Adams reviewed the existing pedestrian conditions that the project team catalogued along the corridor. The southern section of the corridor in Lynn has the best sidewalk conditions along the corridor with few obstructions. Moving north along the corridor, the conditions worsen in front of the commercial districts in Salem, where there is a higher potential for pedestrian activity. There is no

sidewalk in front of the Walmart, and the poorly defined driveways make conditions uncomfortable for pedestrians.

Comment from Lynn Duncan: Perhaps there is low bus ridership because of the poor pedestrian access and accommodations. The project team should look at improving pedestrian accommodations before removing any bus stops. Ms. Chlebek thanked Ms. Duncan for the comment and said the team will consider improvements to pedestrian amenities at the bus stops.

Ms. Chlebek presented the findings on bicycle deficiencies along the corridor. She reviewed different types of cyclists. Each type of user is looking for different experiences, and the project team takes this into consideration when proposing bicycle improvements. Bicycle deficiencies were measured in terms of Level of Traffic Stress (LTS) that bicyclists encounter. Certain types of users are more comfortable with higher LTS than others. LTS 1 is typically an off-street, grade-separated path. A cycle track (an on-street bicycle lane separated from traffic by postings or other objects) on the roadway is an example of LTS 2. LTS 3 typically includes a bike lane for bicyclists. The entire study area, which at best includes a wide shoulder alongside high-speed vehicular lanes with on-road debris and poor pavement, is categorized as LTS 4.

Question from Shelly Bisegna: What percentage of confident bicyclists would be considered a success? Mr. Clark and Ms. Chlebek explained that the percentages are not meant to be used as a target but rather serve as a barometer for the level of bicyclist activity that can be expected along a facility given its environment. The study team will carefully consider the potential demand for future bicyclist activity when making bicycle improvement recommendations.

Mr. Adams presented the findings on vehicular deficiencies throughout the corridor. The corridor was divided into four segments.

Segment A -Chestnut Street to Eastern Avenue in Lynn.

In Segment A there is a lack of turn lanes that causes long queues. Two of the state's top 200 intersection crash rates are in Segment A.

Question from Rep. Paul Tucker: Do we know what causes these crashes? Mr. Adams said the project team will examine the causes of crashes as it looks at collision diagrams provided by the communities.

Mr. Adams reviewed the intersection deficiencies along Segment A. The intersections were observed at peak hours on weekdays while school was in session:

- Chestnut Street showed queueing all the way to Maple Street. The team will be making a collision diagram of this intersection, which will look at the types and causes of collisions. The intersection lacks signal coordination, has old signal equipment, and has curb cuts and parking located in close proximity to the intersection.
- Chatham Street also showed significant queueing. Mr. Adams presented the collision diagram for this intersection. At Chatham Street, the majority of collisions were "turning collisions" caused by low visibility. The intersection lacks turn lanes, and has pedestrian pushbuttons that do not work.
- The Maple Street/Waitt Avenue intersection also showed significant queueing. This section of the corridor has a LOS F and does not have enough capacity. Hazardous conditions are caused by vehicles attempting to access Route 107 at the unsignalized intersection.

- Eastern Avenue is unsignalized but meets criteria to warrant a traffic signal. There is a long queue from vehicles waiting to make a turn. There is a high number of "courtesy crashes," when a vehicle stops in one lane to let another vehicle take a turn onto the roadway but the other lane of traffic is obstructed from realizing this. This intersection is also LOS F, is on the state's list of top 200 crash rate intersections, and has insufficient sight distance on the Eastern Avenue westbound approach.

Segment B-Fayes Avenue to Barnes Road

Ms. Chlebek presented findings on intersection deficiencies along Segment B, which includes shopping areas in Salem. A common problem in this segment is roadway debris, which is likely associated with the nearby quarry.

- The Fays Avenue intersection has low volumes of vehicles, and doesn't meet the need for a warrant for a traffic signal. The timing of the existing traffic signal could be adjusted. There is a driveway in the middle of the signalized intersection without signal control which is of concern. The Route 107 northbound detection is not operating consistently.
- The Walmart intersection lacks sidewalks and crosswalks, which is dangerous for pedestrians. The Walmart driveway approach operates at LOS F on Saturdays, which is not unusual for major shopping areas.
- At the Old Village Drive intersection, vehicles tend to make a lot of illegal U-turns. Pedestrians experience wide crossing distances with no median refuge and there are missing sidewalks and crosswalks.
- The southbound left-turn lane at the Barnes Road/Ravenna Avenue intersection exceeds storage, meaning the left turn lane is not long enough to store the queue of vehicles waiting to turn. The illegal U-turns at this intersection may be associated with motorists wishing to access Swampscott Road in order to avoid the zig-zag movement on Route 107. The median is in poor condition and the intersection is missing sidewalks, crosswalks, and pedestrian signals.

Segment C-Swampscott Road to Hawthorne Square Mall

Mr. Adams shared observations of intersection deficiencies along Segment C, which contains the zig-zag connection between Swampscott Road and Marlborough Road. There is a lack of vehicle progression between traffic lights, which means that vehicle platoons are not progressing through on green indications and are frequently stopped at red lights.

- The Swampscott Road intersection lacks crosswalks, is plagued by illegal U-turns and the right turn movement on the westbound Swampscott Road approach operates over capacity. The traffic signals at Swampscott Road failed to show coordination, and there was significant queueing.
- **Question from Sen. Joan Lovely: There is frequent, significant queueing on First Street. Did you see that?** Ms. Chlebek said yes. That is another roadway that could be helped by better signal coordination. The team recorded a LOS F on the southbound left lane.
- The Marlborough Road intersection shows LOS F on all approaches. There are frequent rear-end collisions, long pedestrian crossing lengths, illegal U-turns and through movements being made from the southbound right turn lane.

- At Hawthorne Square Mall, there are signal coordination issues. Many drivers travel through the parking lot to Traders Way instead of taking Route 107. Pedestrian crossing lengths and missing crosswalks are of concern.

Question from Sen. Joan Lovely: In trying to improve the intersections, is the goal to keep drivers on Route 107? Ms. Chlebek said that the team will review signal coordination to improve flow of traffic on Route 107, but that will be the next step of the project when the team looks at potential improvements.

Comment from Sen. Joan Lovely: There are development opportunities at vacant parcels along Route 107. Ms. Chlebek thanked her for the comment.

Segment D –Willson Street to Boston Street

Ms. Chlebek reviewed the intersection deficiencies of Segment D, the northernmost part of corridor.

- At Willson Street/Cherry Hill Avenue, there is a long westbound queue which extends to the high school driveway and there may be issues with signal timing. Route 107 southbound operates over capacity with the left lane dominated by left turns. The pedestrian audible accessibility operates inconsistently.
- **Question from Beth Debski: When you observed the Cherry Hill Avenue intersection, was that in the AM? The queue is worse in the AM**. Ms. Chlebek and Mr. Adams responded that yes, they do have data that supports that.
- The Salem Hospital lower entrance intersection is unsignalized, and meets the volume warrants for signalization. Pavement markings at the intersection are faded and motorists exiting the hospital driveway experience long delays.
- The intersection of Route 107 and Jackson Street is signalized. Dalton Parkway intersects Route 107 just north of the signalized intersection and is signed for right turns only. However, drivers were observed making illegal left turns onto Route 107 from Dalton Parkway. The intersection experiences a high rate of crashes and is missing crosswalks and pedestrian signals.
- The Boston Street/Essex Street intersection has significant queuing that extends past the fire station driveway, which is problematic during an emergency. The Route 107 northbound left turn lane lacks pavement markings, and experiences long queues. The intersection is missing crosswalks, pedestrian signals, and driveway detection.

Question from David Eppley: **Between Segments 2 and 3, there should be anticipated deficiencies for the construction of the potential new Cinema World complex. What is the project team's plans to include this development?** Ms. Chlebek and Ms. Duncan responded that the team has not been able to procure a traffic study or plans from Cinema World yet. The team will continue to coordinate with the developer and if possible, will incorporate the Cinema World traffic into the future projections.

Question from Andrew Hall: Can you elaborate on the specific deficiency mentioned about the pedestrian push button for Chatham Street? Ms. Chlebek said the push button did not work. Mr. Hall took note of this issue.

Ms. Chlebek stated that at the next Working Group meeting there will be a discussion of ways to address these deficiencies. She showed a map of design constraints. Property lines are the biggest constraint. There are wetlands and historic resources that the project team will consider.

Comment from Andrea Leary: The study needs to look at projected buildout around the corridor when coming up with design. Ms. Chlebek agreed and noted that is why the team is looking at land use and zoning around the corridor.

Ms. Chlebek showed a map of MassDOT's right-of-way (ROW) along the corridor.

Question from Lynn Duncan: Are you working only along the ROW or are there areas outside of the ROW that might need to be improved as well? Ms. Chlebek said that the team will generally stay on the ROW but will consider improvements outside of the ROW if necessary.

Ms. Chlebek stated that at the next Working Group meeting there will be a discussion of improvements and concept designs.

Question from Andrea Leary: Will you be looking at innovative solutions for bottleneck issues besides just widening the lanes? Ms. Chlebek said that a lot of queue management will be done with better signal coordination, but the team will look beyond that to other solutions as well. Ms. Duncan added that McMahon Associates is familiar with and open to creative solutions.

Question: Aside from signal solutions, will the project team consider changing straight and turning lane restrictions? Ms. Chlebek said that the team knows one size does not fit all, and will be looking at a variety of corridor improvements.

Question & Answer Session

Ms. Chlebek welcomed further discussion and questions from the Working Group.

Question from Shelly Bisegna: Would you please send me the traffic study data outside of Salem Hospital? Ms. Chlebek said yes, she can share that data. Ms. Duncan and Mr. Bisegna discussed traffic studies at the hospital.

Question: Is one objective of this study to develop a list of solutions for the short-term? Ms. Chlebek said yes, short-term solutions, such as fixing a broken pedestrian push button, will be developed.

Ms. Chlebek noted the presentation will be posted to the project website. Mr. Clark reminded the Working Group about the online survey and thanked them for attending the meeting.

Working Group Meeting #3 Summary

Route 107 Corridor Study Working Group Meeting #3: Summary

March 2, 2016, 10:00 AM, Lynn City Hall, Room 402, 3 City Hall Square, Lynn, MA

Purpose

At the third Working Group meeting for Route 107 Corridor Study, MassDOT and its consultant team provided a recap of the public meeting in Salem on January 27 and an overview of the online survey results, presented future traffic volumes and analysis, and introduced alternatives. The team also presented a variety of roadway cross sections for three segments along Route 107 in the study area.

Present

Michael Clark, Massachusetts Department of Transportation (MassDOT) Office of Transportation Planning (OTP); Jason Adams and Maureen Chlebek, McMahon Associates; Emily Christin and Sarah Paritsky, Regina Villa Associates (RVA); and the following members of the Working Group:

Sam Barrows, Office of State Representative Paul Tucker
Shelly Bisegna, North Shore Medical Center
Bill Bochnak, Economic Development & Industrial Corporation (EDIC) of Lynn
Ethan Britland, MassDOT
Norm Cole, Lynn Housing Authority & Neighborhood Development (LHAND)
Patrick Delulis, Salem and Lynn Area Chamber of Commerce
Mayor Kim Driscoll, City of Salem
Andrew Hall, City of Lynn, Department of Public Works
Meaghan Hamill, Office of State Senator Thomas McGee
Cheyenne Hidden, The Salem Partnership
Thor Jourgensen, Lynn Daily Item
Andrea Leary, North Shore Transportation Management Association (TMA)
Jenna Lovely, Lovely Law Group
Stephen Lovely, Salem City Council
John Pelletier, Salem Mass in Motion Program Coalition
Connie Raphael, MassDOT
Stephanie Raymond, Office of State Senator Joan Lovely
Bill Rogers
Lucas Santos, Office of U.S. Representative Seth Moulton
Edward Shinnick, Lynn Police Department
Debbie Smith Walsh, Lynn Community Health Center (LCHC)

Meeting Summary

Welcome, Introductions, and Study Process

MassDOT Project Manager Michael Clark opened the meeting, reviewed the agenda, and led a round of introductions. Mr. Clark introduced the study consultant team of McMahon Associates and RVA. He explained that the study team is in the middle of Task 4, Develop Improvement Alternatives, and will

incorporate Working Group feedback before progressing to Task 5, Alternatives Analysis and Recommend Improvements. Mr. Clark stated that the team received good feedback at the public meeting on January 27, 2016 in Salem, and heard concerns regarding the proposed Cinemaworld Project. A follow-up meeting has been scheduled for March 9, 2016 in Lynn and will cover the same material as the first public meeting.

Survey

Sarah Paritsky, RVA, presented the results of the online survey. Ms. Paritsky stated that there was a high number (1,672) of responses, partially due to the local media coverage. She summarized the demographics of the respondents: the respondent pool was less racially diverse and older than the City of Lynn as a whole, according to Census data. Ms. Paritsky explained that most respondents claimed they "never" walk or bike in the corridor, indicating that the respondents were primarily drivers and the survey did not reach many bicyclists and pedestrians who utilize the corridor. She said that overall, the survey responses are consistent with the Existing Conditions report, and most respondents expressed interest in improvements to all modes of transportation within the corridor.

Future Year Traffic Volumes

Maureen Chlebek, McMahon Associates, presented the components that the study team is using to predict future traffic volumes. In addition to background traffic growth, the team is also incorporating special traffic generators, including the Cinemaworld Project based on feedback from the Working Group. The study corridor is broken up into three growth rates based on Central Transportation Planning Staff (CTPS) data. Ms. Chlebek noted that the growth rates for each segment are low, and the corridor has generally been maximized for retail and residential use.

Ms. Chlebek showed the projected peak hour traffic volumes for the Cinemaworld Project, and proposed mitigation, including a signalized intersection at Cedar Road. She noted that by including the data for the Cinemaworld Project, MassDOT is not approving the project; it will need to go through multiple rounds of review at the local and state level.

Overall Improvement Alternative Concepts

Ms. Chlebek reviewed a list of project opportunities, the recommended transit improvements to the corridor, and photos of potential improvements such as bus stop amenities and shelters. She provided a photo of the current type of bus shelter that is typically found throughout Lynn and Salem. Other types of shelters will be explored, depending on the width of the sidewalk that is available to accommodate them. Ms. Chlebek explained that bus operations are also in need of improvements, and the consolidation of bus stops would greatly improve current rider experience. Ms. Chlebek showed a map of the current bus stop spacing along the corridor and a map of a potential consolidation plan. She explained that the MBTA would need to further review this recommendation before it is implemented, with the possible need of public meetings and municipal officials' approval.

Ms. Chlebek presented recommended bus service improvements, which would include a review of Route 456 to expand its service. She explained that the current service ends at 5:00 PM. Public comments from the online survey support the need for expanded Route 456 service and increased bus service overall.

Jason Adams, McMahon Associates, reviewed recommended pedestrian improvements. Mr. Adams said that the study team has looked at locations along the corridor and catalogued places in need of pedestrian improvements. He showed examples of potential improvements such as countdown pedestrian signal heads and marked crosswalks. Mr. Adams said the study team recommends installing a crossing at First Street in Salem, which currently has no marked crosswalk and is close to Hawthorne Square Mall and the Food Bank. The amount of pedestrian traffic at the First Street stop does not warrant a traffic signal or high-intensity activated crosswalk (HAWK) Beacon, but it does warrant a Rectangular Rapid Flashing Beacon (RRFB). A RRFB is activated by a push button and alerts vehicles with flashing lights when a pedestrian is present.

Ms. Chlebek presented recommendations for bicycle improvements along the corridor. She reviewed the criteria for measuring Level of Traffic Stress (LTS), with 1 being the least stress and 4 being the most stress. She explained that the corridor is currently LTS 4, and the goal for the recommendations is to bring the corridor to a lower LTS, where possible. Ms. Chlebek shared examples of the types of separated bikeways that would produce a LTS 1, including a separated bike lane and a shared use path, which would be difficult to implement here due to the limited right-of-way (ROW). She explained that adding a bike lane along the corridor would bring the LTS to 3. She showed a table of the additional changes that would need to be implemented to reduce the LTS to 2 or 1.

Mr. Adams summarized a list of recommendations for vehicular improvements, including potential intersection, corridor, and short term improvements. Mr. Adams clarified that a pedestrian phase is when time is allotted for pedestrians.

Mr. Adams showed a map of three intersections along the corridor that warrant a traffic signal: Stanwood Street/Eastern Avenue at Route 107 in Lynn, Swampscott Road at First Street in Salem, and Salem Hospital Lower Entrance. Mr. Adams noted that just because an intersection warrants a signal, it does not mean that it is required.

Mr. Adams presented two signalization alternatives for the area of the corridor between Stanwood Street/Eastern Avenue and Maple Street/Waitt Avenue in Lynn:

- Prohibit left turns from Eastern Avenue onto Route 107 and make Stanwood Street a one-way street.
- Add a signal to the Stanwood Street/Eastern Avenue intersection and prohibit left turns from Eastern Avenue onto Route 107.

Mr. Adams showed maps of four intersections in Lynn and two intersections in Salem that would benefit from turn lanes. He explained that adding turn lanes would increase vehicular capacity at these intersections, and improve operations and safety.

Mr. Adams presented three locations for potential roundabouts along the corridor in Salem: Swampscott Road, Traders Way/Marlborough Road, and Boston Street. Mr. Adams noted that there are no current roundabouts along the corridor. He said that the Boston Street intersection has particularly heavy vehicular traffic with a good amount of space to accommodate a roundabout.

Mr. Adams reviewed potential traffic calming measures which could be implemented corridor-wide. He provided photos of examples of such measures, including curb extensions and roundabouts, as well as a map of locations along the corridor to implement these measures.

What is a Cross-Section?

Ms. Chlebek explained that a cross-section is how the components of a streetscape within a ROW are allocated, such as the roadway, parking, pedestrian facilities, bicycle facilities, and landscaping. She explained that the study team divided the corridor into three distinct areas of cross-sections: the 66 foot ROW in Lynn, the 90 foot ROW in southern Salem, and the 60 foot ROW in northern Salem. The three sections were designated by their current land use.

Segment by Segment Improvements

Ms. Chlebek showed a map of the three segments:

- Lynn Corridor Segment
- Retail Corridor Segment
- Northern Corridor Segment

Ms. Chlebek presented the recommended improvements for the Lynn Corridor Segment. She presented a map of current bus stops in the Lynn Corridor Segment along with corresponding ridership. She explained that there are many stops with very low ridership, and several are poorly located. The average spacing is 700 feet, and the proposed spacing is approximately 1,000 feet.

Question from Mayor Kim Driscoll: Do the numbers on the map represent the number of passengers? Ms. Chlebek said yes, the first number is the boarding count and the second number is the alighting count. Ms. Chlebek presented a map of the recommended bus stop modifications to the Lynn Corridor Segment.

Question from Mayor Driscoll: Is there a net loss of bus stops in this recommendation, or did you mostly move stops? Ms. Chlebek said that most of the bus stops would remain; a couple have been relocated; and a couple new stops were added to fill in missing pairs. She explained that the point of modifying the bus stops is to simplify and organize the stops so bus operations move more efficiently through the corridor.

Question from Mayor Driscoll: Are you asking for input from MBTA bus drivers? Ms. Chlebek said that this is only a recommendation, and the MBTA will hold its own public meetings and public participation process before implementing any changes to the current routes.

Lynn Corridor Segment

Ms. Chlebek presented three potential cross-sections for the Lynn Corridor Segment:

- Parking Both Sides + Bike Lanes (existing parking is maintained, narrow on-street bicycle lane)
- Parking One Side + Buffered Bike Lanes (on-street buffered bicycle lane, removes parking on one side of the street)
- No Parking + Two Way Separated Bike Lane (removes on-street parking, full separation of bicycles and pedestrians)

Ms. Chlebek indicated that the intention is to have the bicycle lanes plowed in the winter, and noted that moving the curb line adds to the cost of potential improvements.

Comment: It would be a big challenge to eliminate street parking from a commercial interest concern.

Question from John Pelletier, Salem Mass in Motion Program Coalition: Are there any plans for cross sections to include a tree zone? Ms. Chlebek said no, not currently. Mr. Pelletier suggested adding trees in the sidewalk.

Comment from Patrick Delulis, Salem and Lynn Area Chamber of Commerce: Utility poles will pose a cost issue when implementing certain cross sections. It may be easier to divert bike traffic to other roadways. Mr. Clark thanked him for his comment and explained that the point of this meeting is for the Working Group to advise the study team how bicyclists should be accommodated in the cross section recommendations.

Comment from Mr. Pelletier: Bicyclists do not want to be diverted to neighborhood streets. They would prefer a direct route, similar to motorists.

Question from Shelly Bisegna, North Shore Medical Center: Do you have bicycle traffic counts for the corridor? It seems unfair to put the same level of modifications to improve bicycle accommodations when the number of vehicles is much higher. Ms. Chlebek said yes, bicycle counts were taken and they were very low. She explained that the reason for the low numbers could be due to the lack of current accommodations.

Comment from Andrea Leary, North Shore TMA: If the accommodations for bicyclists along the corridor were improved, then the number of bicyclists along the corridor will increase. We should improve Route 107 for all users.

Question from Stephen Lovely, Salem City Council: Can spaces be shared by pedestrians and bicyclists? Ms. Chlebek said that it is possible to reduce the width of sidewalks and add some space to the bicycle lanes.

Question from Meaghan Hamill, **Office of State Senator Thomas McGee:** How will each corridor segment's cross-section transition to the next? Ms. Chlebek explained there would be appropriate transitions in place.

Comment from Andrew Hall, City of Lynn DPW: The City will want to maintain parking on both sides of the street.

Ms. Chlebek and Mr. Adams stated that based on the feedback, the "Parking Both Sides + Bike Lanes" cross-section is the most popular for the Lynn Corridor Segment. The Working Group agreed.

Retail Corridor Segment

Mr. Adams presented the recommended improvements for the Retail Corridor Segment in Salem, as well as a map of bus stops and proposed modification plan. The modification plan adds a stop at Trader's Way, relocates two stops (including the stop by the Walmart), and removes low ridership stops.

Mr. Adams presented three potential cross-sections for the Lynn Corridor Segment:

- Two Lane Roadway + One Way Cycle Tracks (not recommended due to the high volume of vehicles that travel here)
- Four Lane Roadway + Median + Buffered Bike Lanes (maintains the roadways in their current configuration and takes advantage of the 90 foot ROW)

- Four Lane Roadway + Shared-use Path (removes the median, which allows more space for the shared-use path)

Question from Ms. Leary: Is there data regarding an increase of vehicular accidents due to the removal of a median? Mr. Adams explained that he does not know of any data regarding the removal of a median, but there is data for criteria that warrants a median. Mr. Adams and Ms. Chlebek said this is something the study team will have to evaluate further.

A discussion followed regarding the benefits of a median, and the majority of the Working Group expressed that the removal of the median would be disadvantageous and possibly dangerous.

Comment: The addition of trees to the cross-section alternatives should be considered.

Comment: The southern end of Salem is often dangerous for vehicles, and the movement of ambulances and other emergency vehicles through this area should be considered.

Mr. Adams stated that based on the feedback regarding the median, the most popular cross-section for the Retail Corridor Segment is the "Four Lane Roadway + Median + Buffered Bike Lanes." The Working Group agreed.

Mr. Adams presented alternatives for the Zig Zag Segment of the corridor in Salem (Swampscott Road/Route 107/Marlborough Road), all of which include the installation of a traffic signal at the intersection of Swampscott Road and First Street:

- Full Access (would increase safety and can be considered as a short-term improvement)
- No Left Turn onto Marlborough Road – *not recommended*
- No Right Turn from Marlborough Road – *not recommended*
- No Left Turn onto Swampscott Road – *not recommended*
- No Right Turn from Swampscott Road (many vehicles are using this route anyway and it would reduce northbound vehicular traffic on the corridor)
    - **Comment from Mr. Bisegna:** There is significant queueing on Trader's Way on Saturdays that could pose a problem for this alternative. Mr. Adams said that is very helpful feedback, and the study team could consider adding a new lane to the alternative.
- Limited Marlborough Road to Swampscott Road Connection (with physical barrier or lane marking)
- Limited Swampscott Road to Marlborough Road Connection (with physical barrier or lane marking)
- No Connection Between Marlborough Road & Swampscott Road via Route 107
- Swampscott Roundabout – *not recommended*
- Marlborough Roundabout (this alternative can reduce queuing and crashes)
- Marlborough Road Roundabout & No Left Turn onto Swampscott Road (using signage)

Comment from Mr. Delulis: Signal issues should be fixed as soon as possible. The first option seems to make the most sense.

Comment from Mr. Pelletier: Roundabouts offer efficiency benefits.

Comment from Mayor Driscoll: There is ongoing development on Traders Way and First Street, rerouting traffic through that area could be problematic. Has MassDOT considered alternatives that are outside the ROW? Mr. Clark explained that Trader's Way and First Street are already outside of the defined study corridor, and the study team did not consider going outside of the ROW in their alternatives because of the complexity and potential costs. Mayor Driscoll said she would be happy to work with the study team and have further discussions regarding the use of land outside the ROW.

Northern Corridor Segment

Ms. Chlebek presented the recommended improvements, including bus stop modifications, for the Northern Corridor Segment. The modification plan removes low ridership stops and relocates three stops to be more equally spaced.

Ms. Chlebek presented three potential cross-sections for the Northern Corridor Segment, and noted that this is the narrowest segment of the corridor so vehicular traffic flow was prioritized:

- Two-way Left Turn Lane + Bike Lanes (most prioritizing vehicular traffic)
- Two Lane Road + Two-way Separated Bike Lane (most advantageous for pedestrians and bicyclists)
- Two Lane Roadway + Shared-use Path (improvement for pedestrians and bicyclists)

Comment from Mayor Driscoll: It is not always clear when there are two or one lanes in this segment.

Comment from Mr. Pelletier: The study team should consider making transitions at Salem High School where many vehicles are entering and exiting every day.

Comment from Mr. Bisegna: There is a lot of traffic turning in to the Salem Hospital entrance, and adding a turn lane here should be considered. Ms. Chlebek said that turn lanes are definitely part of the study's recommendations and a signal is warranted at that intersection.

Ms. Chlebek noted that based on the feedback from the Working Group the "Two-way Left Turn Lane + Bike Lanes" is the most popular alternative for the Northern Corridor Segment.

Next Steps

Mr. Clark reviewed the study's next steps and noted that the feedback from this meeting was extremely helpful so the study team can move forward. He reminded the Working Group of the study's draft goals and objectives and draft evaluation criteria, and said the study team will be sure that the alternatives that are proposed adhere to these criteria. He thanked everyone for attending and welcomed further comments from the Working Group.

Discussion

Question from Mr. DeIulis: Is the existing drainage system along the corridor being considered and does it limit the alternatives? Ms. Chlebek said yes, the drainage system is part of the construction plans and adds to the costs of the alternatives.

Question from Mr. Pelletier: Has the option of three travel lanes (one in one direction and two in the other direction) in a cross section been considered? Mr. Adams said that was not considered because the traffic volume is very similar in both directions.

Question from Mr. Bisegna: When will the final report be ready? Ms. Chlebek said the final report should be ready this summer.

Question from Mr. Lovely: Can I coordinate with MassDOT to discuss implementing short-term improvements as a Salem City Councilor? Connie Raphael, MassDOT District 4, said that it would be better to wait for the study team to share their recommended solutions before discussing next steps on short-term improvements.

Mayor Driscoll thanked the study team for its work and expressed her support of the evaluation criteria. Mr. Clark thanked the Mayor for her comments.

Question from Edward Shinnick, Lynn Police Department: Can left turn lanes be considered for a short-term improvement? Mr. Adams explained that implementing a left turn may require the removal of parking and/or the installation of a new signal.

Comment from Mr. Delulis: The intersection at First Street and Highland Avenue does not currently warrant a signal, but this could change if the guard rail is removed. Ms. Chlebek said this intersection could be analyzed as part of a future traffic study.

Mr. Clark thanked attendees for their participation, and closed the meeting.

Working Group Meeting #4 Summary

Route 107 Corridor Study Working Group Meeting #4: Summary

June 30, 2016, 10:00 AM, Salem City Hall Annex, Salem, MA

Purpose

At the fourth and final Working Group meeting for the Route 107 Corridor Study, MassDOT and its consultant team presented the alternatives analysis and recommendations for improvements. The project team also discussed plans for the final round of public meetings in Lynn and Salem in September.

Present

Michael Clark and Ethan Britland, Massachusetts Department of Transportation (MassDOT) Office of Transportation Planning (OTP); Maureen Chlebek and Angela Saunders, McMahon Associates; Emily Christin and Sarah Paritsky, Regina Villa Associates (RVA); and the following members of the Working Group:

Gary Barrett, North Shore Alliance for Economic Development
Ralph Coluntino, Office of Congressman Moulton
Lisa Darlington, Greater Lynn Senior Services
Gina Manning, City of Lynn DPW
Beth Debski, The Salem Partnership
Patrick Delulis, Salem and Lynn Area Chamber of Commerce
Barry Driscoll, Salem Police Department
Mayor Kim Driscoll, City of Salem
Lynn Duncan, City of Salem
David Eppley, Salem City Council
Russell Findley, Mass in Motion
Darlene Gallant, Lynn Economic Opportunity
Gary Hebert, Stantec
David Knowlton, City of Salem
Andrea Leary, North Shore Transportation Management Association (TMA)
Stephen Lovely, Salem City Council
Rinus Oosthoek, Salem Chamber of Commerce
Connie Raphael, MassDOT
Bill Rogers
Edward Shinnick, Lynn Police Department
Jason Silva, Office of Senator Lovely
Jon Thibault, Lynn Housing Authority & Neighborhood Development (LHAND)
Sara Timoner, MassDOT
Rep. Paul Tucker, Massachusetts House of Representatives
Jeff Weeden, LHAND
Kathy Winn, City of Salem

Meeting Summary

Welcome, Introductions, and Study Process

MassDOT Project Manager Michael Clark opened the meeting, reviewed the agenda, and led a round of introductions. Mr. Clark introduced the study consultant team of McMahon Associates and RVA. He explained that the study team is in the middle of Task 5, Alternatives Analysis and Recommended

Improvements. He said that public meetings will be held in Salem and Lynn in September during the public comment period for the Final Report (Task 6). Mr. Clark provided a recap of the previous working group meeting in March, and said the feedback was heavily incorporated into the analysis.

Segment by Segment Improvements

Maureen Chlebek and Angela Saunders, McMahon Associates, presented the existing conditions and proposed improvements to each of the 15 key intersections within the study corridor's three segments: the Lynn Corridor Segment, Retail Corridor Segment, and Northern Corridor Segment. The proposed improvements were designed to fit with the cross-sections agreed upon at the previous working group meeting for each segment. Ms. Chlebek reviewed the design considerations for the corridor, which included staying within the right-of-way (ROW) to minimize impacts and choosing the most cost-effective solutions. Maps detailing the proposed improvements to the following intersections and road segments can be reviewed in the meeting presentation on the project website: www.mass.gov/massdot/route107. Detailed discussions regarding these intersections and road segments are described below.

Summary of Changes in Lynn Corridor Segment (Parking Both Sides + Bike Lanes cross-section)

- Provided bicycle accommodations throughout segment and at each intersection
- Improved pedestrian accommodations through sidewalk replacement to meet the Americans with Disabilities Act (ADA) standards
- Enriched transit accommodations by providing ADA compliant bus stops and adjusted bus stop locations
- Increased safety with left turn lanes and reduced lane width to slow traffic speeds
- Improved vehicle operations with added capacity and signal timing/coordination improvements
- Identified opportunities for access management
- Minimized parking impacts to extent possible

Intersection-Specific Improvements:

Route 107 at Chestnut Street

- Existing conditions: This intersection has wide lanes, no left turn lanes, and sub-par pedestrian ramps.
- Proposed improvements: The Route 107 northbound (NB) and southbound (SB) bus stops were relocated, sidewalks added, left turn lanes added to all approaches, and signal coordination improved.

Route 107 at Chatham Street

- Existing conditions: This intersection has similar conditions to Route 107 at Chestnut Street, as well as no delineated parking spaces.
- Proposed improvements: Left turn lanes were added to all approaches, improved signal coordination, and relocated bus stops to provide a level landing for both front and rear doors.

Route 107 at Eastern Avenue & Route 107 at Waitt Avenue

- Existing conditions: These two intersections produce conflicting traffic movements, have no turn lanes, and the roadway cross-section is constrained by the floating Buchanan Bridge.

- Proposed improvements: The improvements at both intersections play off of one another, and include left turn restrictions from Route 107 to Waitt Avenue and from Eastern Avenue to Route 107; left turn lanes added to Maple Street, Waitt Avenue, and Route 107 southbound; added curb extensions; installed planted island on Eastern Avenue; relocated bus stops; and improved signal coordination.

Route 107 at Fays Avenue

- Existing conditions: This intersection is constrained by ledges and the residences close to Route 107 and has poor sidewalks.
- Proposed improvements: Relocated bus stop closer to pedestrian crosswalk to provide level landing at rear and front doors, improved sidewalk including an 8-foot sidewalk at bus stop, new buffered bike lanes, and improved signal timing/coordination.

Route 107 Corridor Transition at Lynn/Salem border

- Existing conditions: The transition at the Salem and Lynn city border from two travel lanes to one travel lane heading south occurs suddenly.
- Proposed improvements: Lengthened the transition from two lanes to one lane, replaced the guardrail with a planted median, and added buffered bike lanes.

Summary of Changes in Retail Corridor Segment (Four Lane Roadway + Median + Buffered Bike Lanes cross-section)

- Added buffered bicycle lanes through most of segment
- Improved pedestrian accommodations by adding pedestrian crosswalks at key intersections and added sidewalk to the west side of Route 107
- Enriched transit accommodations by providing ADA compliant bus stops and adjusted bus stop locations
- Increased safety by reducing lane width to slow traffic speeds
- Improved vehicle operations through signal installation and signal timing/coordination improvements
- Provided aesthetically pleasing median

Intersection-Specific Improvements:

Route 107 at Walmart Drive

- Existing conditions: Lack of sidewalk and pedestrian crossings.
- Proposed improvements: Added crosswalks and sidewalks, removed guardrail, added planted median, added buffered bicycle lanes, converted right-turn-only lane into shared lane, relocated bus stops to provide level landing at rear and front doors, and improved signal timing/coordination.

Route 107 at Olde Village Drive

- Existing conditions: Lack of sidewalk on one side of Route 107 and only one pedestrian crossing.

- Proposed improvements: Added three crosswalks and sidewalks to both sides of Route 107, removed guardrail and converted to planted median, added buffered bicycle lanes, and improved signal timing/coordination.

Route 107 at Barnes Road

- Existing conditions: Lack of crosswalks and sidewalks.
- Proposed improvements: Added crosswalks and sidewalks, removed guardrail and converted to planted median, added buffered bicycle lanes, relocated bus stops, and improved signal timing/coordination.

Zig Zag Segment

Ms. Chlebek reviewed the discussion regarding the Zig Zag segment, which includes the intersections of Route 107 at Marlborough Road, Traders Way, and Swampscott Road, at the previous meeting and presented what the project team has advanced since that meeting. The project team is still recommending the short-term "Full Access" improvements which would increase safety by signalizing the intersection at First Street and Swampscott Road, improving signal coordination, and reallocating the green time.

Ms. Chlebek reviewed the alternatives that remained for further consideration after the previous meeting, and noted that more constraints within the segment became apparent as the team looked at them in more detail. Detailed maps and descriptions of the following alternatives to the Zig Zag segment can be found in the meeting presentation on the project website linked above:

1. Dual Left Turn at Swampscott Road and Marlborough Road
2. Marlborough Road Roundabout and Dual Left Turn Lanes at Swampscott Road
3. Marlborough Road Roundabout Shifted Toward CVS with Northbound and Southbound By-Pass Lanes and Dual Left Turn Lanes at Swampscott Road
4. Swampscott Road at Highland Avenue Intersection Relocation

Ms. Chlebek noted that the alternatives listed above are not recommended because they would require the removal of several businesses and residential buildings, and the Level of Service (LOS) is still rated "F" or "E" at peak hours. The below alternatives are still under consideration:

5. Elimination of the Connection Between Marlborough Road & Swampscott Road via Route 107 by implementing turn and lane restrictions
6. Marlborough Road Roundabout & No Left Turn onto Swampscott Road

Comment from Patrick DeIulis, Salem and Lynn Area Chamber of Commerce: At the last meeting, Salem Mayor Kim Driscoll expressed concern for traffic being redirected to Traders Way, but there is also a lot of traffic on First Street. Could the project team look into rerouting vehicles earlier onto First Street from Route 107? Mr. Clark thanked Mr. Delulis for sharing the idea and said he would look into it further.

Question from Ralph Coluntino, Office of Congressman Moulton: Would the fifth and sixth Zig Zag alternatives involve the taking of buildings? Ms. Chlebek said no, the changes are primarily within the ROW and do not require building acquisition.

Question from Mr. DeIulis: Has the project team addressed the potential Cineplex with the alternatives? Mr. Clark said the intention of the Zig Zag alternatives is to keep traffic moving as much as possible.

Question/Comment from Mayor Kim Driscoll, City of Salem: Would the prohibited movements in the proposed Zig Zag alternatives be implemented 24 hours per day or just during peak hours? Ms. Chlebek said the project team planned for the restriction to be at all times, but a peak hour restriction can be looked into further. Mayor Driscoll said she is concerned that rerouting traffic onto Traders Way will not solve the queueing problem, and would just relocate traffic queues to Traders Way from Route 107. Ms. Chlebek said that rerouting traffic to Traders Way would result in a more efficient through-traffic movement than current conditions on Route 107. She added that more movements would become through-movements as opposed to turns, so they would be given more green time and encounter less traffic conflicts. Mayor Driscoll asked if the project team could produce a traffic model that shows the result of shifting a portion of Route 107 traffic to Traders Way. Mayor Driscoll thanked the project team for their work and commended them on all the reviews that were done since the last meeting.

Question from Andrea Leary, North Shore TMA: Can vehicles still make a left turn onto Route 107 from Traders Way in the proposed Zig Zag alternatives? Ms. Chlebek said yes.

Comment from David Eppley, Salem City Council: Vehicles may attempt to cut through the McDonald's parking lot at Traders Way. Ms. Chlebek said a lot of cut through traffic is already occurring, and the alternatives may lessen that.

Question from Jeff Weeden, LHAND: Is there room for any more capacity on Traders Way, perhaps an additional lane? Ms. Chlebek said all of this is still at a concept level design and this could be explored further along in project development.

Route 107 at Hawthorne Square Mall

- Existing conditions: Only one through lane on Route 107 southbound.
- Proposed improvements: Added buffered bicycle lanes, relocated bus stop for better retail area access, converted right-turn-only lane into shared lane, and improved signal timing/coordination.

Route 107 Corridor Transition at Crowdis Street

- Existing conditions: The pedestrian bridge at Crowdis Street is a major constraint, and the lane merge happens quickly.
- Proposed improvements: Lengthened the transition from two lanes to one lane heading north, added bicycle lanes, removed existing bus stops, and replaced guardrail with planted median.

Question from Mr. DeIulis: Can the median be shifted so as not to cut off Mooney Road? Ms. Saunders said the median will not block Mooney Road, she can modify the map to reflect that.

Comment from Councilor Eppley: There are many existing residential buildings in this area and more are being developed, so the median may cut these residents off from easily crossing Route 107. Mayor Driscoll added that it may be dangerous to remove the median because of vehicles making unsafe left turns. Barry Driscoll, Salem Police Department, described an issue with the left turn at Willson Street.

Ms. Chlebek said a two-way left turn lane could be implemented here, but not at the High School due to space constraints.

Summary of Changes in Northern Corridor Segment (Two-way Left Turn Lane + Bike Lanes cross-section)

- Added bicycle provisions throughout segment
- Improved pedestrian accommodations by replacing sidewalks and adding crosswalks
- Enriched transit accommodations by providing ADA compliant bus stops
- Increased safety with left turn lanes and reduced lane width to slow traffic speeds
- Improved vehicle operations by adding capacity via exclusive turn lanes, a two-way left-turn lane, installing a signal at Salem Hospital and optimizing signal timing/coordination

Intersection-Specific Improvements

Route 107 at Willson Street

- Existing conditions: Unclear lane striping, and very narrow ROW due to pedestrian bridge in front of high school.
- Proposed improvements: Installed left turn lane from Route 107 onto Willson Street and right turn lane from Route 107 onto Willson Street, added buffered bike lanes (the project team considered routing the bicycle lanes around Salem High School, and will suggest that this be considered as the project moves into the next stage), relocated bus stop, and improved signal timing/coordination.

Comment from Mayor Driscoll: The land abutting the pedestrian crosswalk is owned by Salem High School (and by extension, the City of Salem), so perhaps relocating the entrance to the high school would solve some issues at this intersection and better accommodate bicyclists. Ms. Chlebek said the project team will suggest that this be considered in the next phase of the project.

Comment from Beth Debski, The Salem Partnership: Removing a lane between Willson Street and Valley Street seems like it could cause backups. Ms. Chlebek said the bicycle lanes would have to be removed in order to add another lane. It would be possible to remove the bicycle lanes after these changes are implemented if it proves necessary. Ms. Debski suggested keeping two lanes in each direction through Valley Street.

Route 107 at Salem Hospital Lower Entrance

- Existing conditions: No traffic signal and lack of crosswalks and sidewalk.
- Proposed improvements: Added new traffic signal, bike lanes, a two-way left turn lane in front of Proctor Street, and crosswalks and sidewalk.

Comment from Lynn Duncan, City of Salem: Has Shelly Bisegna, Salem Hospital, provided the project team with the hospital's development plans? Ms. Chlebek said they received plans at the early stages of the study, but are not sure if they received the full plans. Ms. Duncan suggested the project team reach out to City of Salem's Planning Department for the plans.

Route 107 at Dalton Parkway and Jackson Street

- Existing conditions: Unclear signage for left turn restriction and lack of crosswalks.
- Proposed improvements: Extended island between Dalton Parkway and Jackson Street to Route 107, added buffered bike lanes and crosswalks, added buffered bike lanes, and improved signal timing/coordination.

Question from Stephen Lovely, Salem City Council: Is it dangerous to design a bike lane between two lanes of vehicular traffic? Ms. Chlebek said the bike lane for bicyclists traveling straight would be adjacent to a right-turn-only lane, and that it is the design standard. She added that painting on the roadway can help make drivers aware. Ms. Saunders noted that it is important to keep in mind that the proposed cross sections narrow the through lanes on Route 107 in order to slow vehicles down significantly and increase safety.

Comment from Ms. Duncan: There is a movement now to put bicycle lanes next to sidewalks with parked cars on the other side next to traffic; will that be considered in this study? Ms. Chlebek said that there is a risk of placing bike lanes next to parked vehicles when car doors open into the bike lanes. She said that there are pros and cons to both designs. Ms. Duncan said the project team should share these plans with the Salem Bicycling Advisory Committee. Ethan Britland, MassDOT, explained if the roadway is wide enough, ideally there would be a buffer between bike lanes and parked cars to prevent car doors from opening into the bike lanes.

Comment from Mayor Driscoll: The City of Salem owns the land here as part of Collins Middle School, so the City may be able to provide the land to MassDOT to increase the width of the corridor and accommodate the bicycle lanes.

Route 107 at Boston Street

- Existing conditions: There are a lot of traffic movements at this intersection and a fire station that can be blocked by traffic.
- Proposed improvements: Raised shared streets to serve pedestrians, cyclists, and driveway access along Route 107, realignment of the intersection to allow Route 107 to proceed as a through-movement, added buffered bike lanes and crosswalks, added left turn only lane, and available space in the shared street in front of the fire station for a monument or landscaping. Ms. Chlebek explained that a shared street is like a driveway, where pedestrians and vehicles share the road and vehicles move very slowly.

Mayor Driscoll said she liked the idea of shared streets in this area and would like the businesses to weigh in on this proposal. A discussion followed about various ways bike lanes could be accommodated.

Comment from David Eppley: We would need clear demarcations to prevent drivers from blocking the fire house.

Comment from Ms. Duncan: The concept of shared streets is not new, and many cities around the world are implementing them into their plans. There was a discussion in Salem about shared streets in the past but it never moved forward, so it will be interesting to see this happen.

Comment from Ms. Debski: There is a convenience store at this intersection that appears to be blocked by the median, and cars may not be able to turn left into it. Ms. Chlebek said the project team will look into this and could consider breaking the median or painting lines instead of a raised median here.

Next Steps

Mr. Clark reviewed the study's next steps, which include a 30-day comment period on the Draft Report, and two public meetings in September. After the Final Report, MassDOT will continue to have discussions with the Cities of Lynn and Salem and carry forward any ideas that have public support. He welcomed further comments from the Working Group.

Discussion

Comment from Mr. DeIulis: The proposed left-turn lanes in Lynn may need more capacity for the volume of vehicles, otherwise vehicles waiting to turn may lead to accidents. Mr. Clark said the left-turn lanes were added to alleviate the high crash rate on the corridor, and it is generally considered a safe space for vehicles to wait.

Comment from Edward Shinnick, Lynn Police Department: There may be a lot of resistance to the removal of parking spaces at the Chatham Street intersection, particularly from local business owners. Darlene Gallant, Lynn Economic Opportunity, said a previous Working Group member expressed concern about parking near John's Roast Beef & Seafood, and there is a daycare center on Waitt Avenue that would be impacted. Mr. Clark thanked them for their comments and said the project team will consider this.

Question from Mayor Driscoll: A discussion took place at the previous meeting regarding a communication model with the MBTA regarding the proposed shifting of bus stops. Mayor Driscoll asked if any discussions have begun with the MBTA. Mr. Clark said there is a representative from the MBTA on the working group, but she is not present at this meeting. He added that the MBTA has its own process regarding changes to bus routes and bus stops that will need to be carried out, and the project team will be sure to share all of the proposed improvements from this study with the MBTA.

Mr. Clark thanked attendees for their participation and said the feedback has been extremely helpful to the project team, and closed the meeting.

APPENDIX C

Public Meeting

Public Meeting #1 Summary
Salem

Route 107 Corridor Study Public Meeting #1: Summary

January 27, 2016 – 6:00 PM

Salem High School Auditorium, 77 Willson Street, Salem, MA

Project Team

Michael Clark, Massachusetts Department of Transportation (MassDOT) Office of Transportation Planning (OTP); Maureen Chlebek and Jason Adams, McMahon Associates; Nancy Farrell and Sarah Paritsky, Regina Villa Associates (RVA).

Present

The following elected officials attended, plus members of the public (see attendance):

- Kimberley Driscoll, Mayor, City of Salem
- David Eppley, Salem City Council
- Heather Famico, Salem City Council
- Tom Furey, Salem City Council
- Elaine Milo, Salem City Council
- Stephanie Raymond, Office of Senator Joan Lovely
- Paul Tucker, Massachusetts House of Representatives

Meeting Purpose

This was the first public information meeting on the Route 107 Corridor Study. The purpose of this meeting was to introduce the study to the communities of Lynn and Salem, and welcome feedback on the study framework and work completed to date. The presentation shown at this meeting is posted on the project website at:
http://www.massdot.state.ma.us/planning/Main/CurrentStudies/Route107CorridorStudy.aspx

Meeting Summary

Welcome and Introductions

MassDOT Project Manager Michael Clark opened the meeting, reviewed the agenda, and introduced elected officials present at the meeting, including Salem Mayor Kimberly Driscoll and Massachusetts Representative Paul Tucker (7th Essex District).

Mayor Driscoll introduced additional local officials in attendance: Salem City Councilor Dave Eppley, Salem City Councilor Heather Famico, Salem City Councilor Elaine Milo, Salem City Councilor Stephanie Raymond, and staff of Senator Joan Lovely. Mr. Clark also welcomed Debbie Smith Walsh, of Lynn Community Health Center, and City of Salem staff, Lynn Duncan, Director of Planning and Community

Development, and David Knowlton, City Engineer. Mayor Driscoll encouraged attendees to participate in the online survey and said she was happy to see state resources devoted to the Route 107 Corridor Study. She highlighted some of the existing issues on Highland Avenue, including traffic and concern about growth, including the CW Theaters Cinema Complex (Cinemaworld).

Mr. Clark reviewed the study process and outlined the five study tasks. The study has progressed to the end of Task 3: Evaluate Existing Conditions and Identify Transportation Issues. There will be two more Working Group meetings and one more public meeting before the study is completed. Mr. Clark introduced the study consultant team of McMahon Associates and RVA. Mr. Clark explained the role of the Working Group, which consists of local officials, residents and stakeholders.

Mr. Clark introduced Nancy Farrell, Regina Villa Associates, who outlined the goals of the study's bilingual online survey. The survey launched in October 2015 and will close on January 31, 2016. She encouraged attendees to participate in the survey to provide feedback on existing issues for all modes, if they had not already. Ms. Farrell asked that meeting attendees hold all questions until the end of the meeting, so the study team can cover all of its presentation. She will facilitate a question and answer session at the end of the presentation.

Maureen Chlebek, McMahon Associates, described the goals of the study, followed by the evaluation criteria, which helps the study team evaluate its alternatives.

Existing Transportation Conditions

Ms. Chlebek explained that the study area, which extends from Chestnut Street in Lynn to Boston Street in Salem, includes 15 key intersections. While 35% of the roadway is under local jurisdiction (at the far north and south ends of the corridor), 65% is under MassDOT jurisdiction.

Jason Adams, McMahon Associates, described the study's data collection effort to better understand existing traffic conditions. The team collected automatic traffic recorder (ATR) counts and turning movement counts for vehicles, pedestrians, and bicycles during the weekday AM and PM peak periods and Saturday peak periods at the 15 study area intersections. Vehicle counts were fairly consistent for northbound and southbound traffic. The largest vehicle volumes are between Swampscott Road and Marlborough Road.

Mr. Adams said that while bicycle counts were very low (0 to 2 bicyclists per peak hour), he does not interpret that to mean there is low demand. The roadway conditions make bicycling a challenge. Mr. Adams identified the five intersections with the highest pedestrian volumes, which were concentrated in the southern portion of the corridor. McMahon performed a license plate matching survey to better understand the zig-zag movement of vehicles between Swampscott Road, Route 107/Highland Avenue, and Marlborough Road. Mr. Adams explained that five out of the 15 intersections have a crash rate higher than the MassDOT average; three are listed on the top 200 crash intersections in Massachusetts. McMahon is looking at data to see if there are patterns or problems that could be alleviated as a result of the study.

Ms. Chlebek provided an overview of existing transit conditions. The study area overlaps with three Massachusetts Bay Transit Authority (MBTA) bus routes – the 424, 450, and 456 – which vary in service, ridership, and frequency. Ms. Chlebek noted that some stops have a particularly low volume of passengers boarding and alighting buses, while others are missing a corresponding stop on the other side of the road.

Ms. Chlebek described maps that her team has developed for land use, zoning, environmental resources, environmental justice, and cultural and historic resources.

Traffic Operations

Ms. Chlebek explained that traffic engineers assign an overall level-of-service, ranging from A to F, to each intersection to evaluate its capacity and operations. A level-of-service rating of "D" is acceptable for MassDOT standards, but "E" or "F" ratings are problematic. Ms. Chlebek said this rating is one tool and does not tell the whole story. For example, the team has also looked at the queue lengths (the number of stacked vehicles) at major intersections and whether the queues extend to adjacent intersections.

Future Year Traffic Volumes

Ms. Chlebek emphasized the importance of making long term improvements of the corridor to serve future traffic volumes. The Central Transportation Planning Staff (CTPS) predicted 0.1% to 0.3% traffic growth per year between 2015 and 2035. Ms. Chlebek explained this data is based on historical data, future population and employment projections, and known developments in the permitting stage. The study team was made aware of the high level of community concern about the Cinemaworld development proposed near Ravenna Avenue and Cedar Drive. With guidance from the City of Salem, the study team has decided to account for the proponent's projected traffic data and proposed traffic mitigation. This consists of installing a signal and northbound and southbound left turn lanes at the intersection of Route 107 with Cedar Drive and the proposed site driveway. Ms. Chlebek said the study team will make sure the development would not preclude any design recommendations resulting from the study.

Transportation Issues/Deficiencies

Ms. Chlebek presented the findings on transit deficiencies, which include low ridership, close bus stop spacing, and missing matching stops. While the MBTA guidelines suggest that the spacing between stops be between 750 and 1,350 feet, 30 stops along Route 107 are less than 750 feet apart, which suggests these stops could be managed differently. Many bus stops are missing pedestrian amenities, such as sidewalk connections.

Mr. Adams reviewed pedestrian deficiencies along the corridor, including poor sidewalk conditions and missing crosswalks and curb ramps. He described the catalog of pedestrian amenities the team has complied, and provided an example of pedestrian conditions in Salem.

Ms. Chlebek provided some background on the cyclist population. Any proposed improvements aim to draw from the "interested but concerned" population (about 60% of the overall population). McMahon rated bicycle conditions throughout the corridor as a level of traffic stress (LTS) 4, which is the highest level of stress and based on conditions such as proximity to vehicles. The study team hopes to improve the LTS to a LTS 3, or even LTS 2 in some spots.

Mr. Adams reviewed vehicular deficiencies, including queuing that inhibits movements from adjacent intersections, signal issues, and pavement conditions. The study team divided the corridor into four segments and narrowed in on vehicular deficiencies in each area, which Mr. Adams and Ms. Chlebek subsequently presented, from south to north:

- Segment A – lack of signal coordination, high crash locations, turning lanes, queueing issues, old signal equipment
- Segment B – access management, roadway debris, wide crossings, queue issues, missing sidewalks/crosswalks
- Segment C – vehicle progression, queue storage, signal coordination, roadway debris, high speeds, illegal U-turns
- Segment D – pavement markings, queue storage, access management, missing crosswalks

Next Steps

Mr. Clark described next steps for the Route 107 Corridor Study. With help from the Working Group, the study team will define design constraints, begin to develop improvement concepts, evaluate those improvement concepts, and estimate costs. At the second public meeting, the study team will share its recommendations for public feedback. Mr. Clark encouraged attendees to visit the project website to sign up for emails and download the meeting presentation and summary. MassDOT will notify the study's email list when the materials have been posted.

Question & Answer Session

Ms. Farrell asked if any elected officials would like to ask questions or make comments. Salem City Councilor Heather Famico asked if the study is considering plans for a possible senior center at the intersection of Boston Street and Bridge Street. Ms. Chlebek confirmed anything within a one-mile radius is being considered as part of the study and asked Ms. Famico to share the plans.

John Coleman Walsh asked the attendees to raise their hands if they were Salem or Lynn residents. More participants were from Salem than Lynn. Mr. Walsh requested that the study hold its next meeting in Lynn.

An attendee asked how the quality of life in the corridor could improve and crash areas be addressed if 2,500 cars are added to the road due to the Cinemaworld development. Several additional comments were made regarding the proposed Cinemaworld development, many of which encouraged MassDOT not to approve a proposed curb cut related to the development. Ms. Chlebek clarified that MassDOT is not approving the development, but rather anticipating future traffic resulting from the development if it is permitted. The Route 107 study started in February 2015, and the team was made aware of the proposed development by way of the Working Group during its first meeting in June. Typically developments are not included in the study until they are in the permitting stage, but the team was advised of the public concern and decided to include it. The proposed project will be required to go through the City approval process and the Massachusetts Environmental Policy Act (MEPA) approval process, which includes MassDOT approval for curb access and traffic mitigation. Mr. Clark explained that since the developer has not filed a permit with the state, he cannot speak to the plans. MassDOT's role in the MEPA approval process concerns appropriateness of a developer's mitigation plans to access state-owned roadways. It does not evaluate proposals from a quality of life perspective for the community as it is not the state's desire or responsibility to dictate land use planning for cities and towns.

Lynn Duncan, City of Salem, said there will be a local process for the Cinemaworld development, with a public hearing and planning board meeting. The City will hire a peer reviewer to examine the traffic data

used in the developer's proposal. Ms. Duncan thanked MassDOT for incorporating the traffic data into the Route 107 study. Ms. Duncan later added that the City has lobbied the state to conduct the Route 107 study going back to the Lowe's/Walmart development proposal.

Salem City Councilor-at-Large Tom Furey said the city was approached by the owner of the property 15 years ago to purchase the land for a school, before the Cinemaworld developer owned the property. He thinks the development is good for the city.

A Salem resident commented that the study for Walmart done in 2010 identified that the Route 107 roadway could not handle any additional traffic. The resident asked the study team if it would recommend the Cinemaworld development. Ms. Farrell said the team cannot answer such a question since it is not the team's decision. Ms. Chlebek noted that McMahon is not conducting a peer review of the proponent's traffic study and therefore, cannot comment on the traffic projections and/or proposed mitigation.

An attendee suggested adding a right-turn-only lane from Swampscott Road onto Route 107. Mr. Adams explained that geometric changes could help improve capacity, and is not sure who owns the land adjacent to Swampscott Road. He said he will look into this idea.

An attendee described an issue at Olde Village Drive regarding illegal U-turns and vehicles running red lights. She asked about the curb cut for the proposed senior center and requested more coordination between MassDOT and the City of Salem. Mr. Clark said MassDOT's Highway Division reviews curb cuts for compliance, but permitting decisions are done at the local level, where officials better understand local issues. Mr. Adams noted the developer must get local board approval and MassDOT approval. The study's final report will also catalog signal and crash issues at Olde Village Drive.

A resident of Fays Avenue in Lynn asked about some U-turns that are illegal for trucks but not other vehicles. Ms. Chlebek confirmed that sometimes this is the case and sometimes the sign can be hard to see; the study team is rethinking the median because it breaks up the roads and necessitates U-turns.

An attendee asked when bicycle counts were taken. Mr. Adams said his team took bicycle counts for the original study area's ten intersections in March and April 2015. After five intersections were added, per guidance of the Working Group, bicycle counts were done in July and August. Counts were normalized for the seasonal difference.

An attendee described an issue turning onto Ravenna Avenue from Route 107. Additionally, she commented that there are very few sidewalks in Lynn, and no one maintains or removes snow from the sidewalk. She added that trucks drive very high speeds early in the morning and do not obey traffic lights. Ms. Farrell thanked the participant for her comments and said that the notes will reflect residents' comments on these issues.

An attendee commented that residents and businesses should have different rules for maintenance. She described issues with plows dumping snow into driveways and on sidewalks, particularly problematic last winter. She cited the need for more enforcement to prevent people from driving in the breakdown lane and parking where it is not allowed. Ms. Farrell thanked her for her comments and apologized for the inconvenience.

A resident of Salem requested the addition of a driveway at Collins Middle School next to Salem Hospital. She expressed concern for safety with kids walking in the area. Ms. Chlebek said she will look into the location and concern.

One attendee said the intersection of First Street and Swampscott Road should be part of the study. Mr. Adams explained this is not one of the primary intersections, but it is very much a part of the study and will be considered for geometric improvements and signal changes. McMahon has done traffic counts at this intersection.

A comment was made about the proximity of the entrance and exit driveways to Hawthorne Square Mall. Mr. Adams noted these are on private property, but the team hopes to improve the overall connection to the mall.

An attendee asked a question about the additional cars projected on Route 107. Mr. Adams explained that 0.1% to 0.3% per year, compounded over 20 years, is significant growth. The CTPS model accounts for smaller developments that will be proposed and built over the decades.

An attendee expressed concerns regarding accidents and trust in the state, and said she does not see how these problems can be fixed. Ms. Farrell explained the next step in the study is to develop potential solutions. She encouraged interested parties to listen at the next Working Group meeting and/or attend the next public meeting, and email any comments to Mr. Clark.

An attendee asked if any residents are on the Working Group. Several members of the Working Group present announced that they are residents. The attendee also noted that a prevalent issue along the corridor was the lack of enforcement of traffic violations.

Rep. Paul Tucker said before he was elected he was a Police Chief in Salem. At that time, Salem was the third highest town for citations and enforcement in the state. The biggest challenge in enforcement is manpower. Engineering improvements will also help reduce speeds.

An attendee said she was having trouble hearing the presenters. Ms. Farrell said the team will seek to improve the sound system at the next meeting.

An attendee asked how the study will determine if it was successful. Mr. Clark said that while crash and traffic data are measured on a continual basis determination of success for any implemented recommendations and alternatives is largely based on community feedback.

An attendee said more outreach is needed in Lynn and the next public meeting should be in Lynn.

An attendee noted a hidden problem where sand is getting into pipes that lead to the wetlands. Piles of sand are creating plumbing problems. Any new catch basins should be oversized to catch sand.

An attendee described a blind turn at Ravenna Avenue due to snow banks. He asked how long it will take MassDOT to make improvements. Mr. Clark said there will be short-term improvements, such as signage and signal changes, which can happen immediately, and long-term improvements, which have to compete with other transportation projects throughout the region. Mr. Clark encouraged people to continue advocating for funding with local officials and state representatives.

Ms. Farrell thanked everyone for attending and providing comments. She closed the meeting at 8:10 PM.

Attendance

Seth Albaum, Lynn Happens
Marie Aloisi
Elizabeth Anderson
Carl Andrews
Cindy Anselmo
Chuck Barton, Neighborhood Group
Edward Bayard
Marci Benson, Benson Communications
Jan & Jim Bettger, Indian Hill Lane Salon
Joan Bissett
Mary Jane Blais
David Bowen
Ethan Britland, MassDOT
Mary Butler
Lucille C
George & May Carey
Jeanette Chavarin
Becky Christie
Eileen Cole
Norm Cole
Joseph Correnti
Leslie Courtemanche
Myrna Cudlik
Beth Debski, The Salem Partnership
Ann DeIulis
Patrick DeIulis, Salem Chamber of Commerce
Sharon Deveraux
Steve Dibble
Michael Donahue
Lynn Duncan, City of Salem, Department of Planning and Community Development
Laura Fleming, North Shore TMA
Patricia Fusco
Darlene Gallant, LEO
William Gondellc
Mary Graham
Jane Guy
Giles Ham, Vanasset Assoc.
David Hark, The Drumlin Group
John Holian
Helen Hughes
Beth Isler
Deb Jeffers
James Jellison
Barbara Jones
Ken Jones
Joanna Kavalaris
David Knowlton, City of Salem
Joann Kowalski
L. Langone
Andrea Leary, North Shore TMA
Annette Levitt
Anthony Liberti
Pat Liberti, Ward 4/Gallows Hill Neighborhood Group
Stephen Lovely, Lovely Law Group LLP
Dustin Luca, The Salem News
Mary Madore
Rosemary Masters
Jeanne McAuley
Michael McMahon
Sandra McMahon
J Melanson
Ralph Meneads
Geoffrey Millar
Rinus Oosthoek, Salem Chamber of Commerce
Pam Oppelt
Karen & Paul Pagnotti
Michele Parr
Michael Pelletier
Anne Pellitier
Jason Pivacek
Mary Powers
Bill Rogers, City of Lynn
Anne Romano
Robert Ross
Kathy Sands
Nicholas Sansone
Susan Schuer
Edward Shinnick, Lynn PD
Wayne Silva
Marilyn Smith Melanson, Sanctuary Salon
Deborah Smith Walsh
Bob & Nancy Stapleton
Lorelee Stewart
Ted Stolz

Beverly Strauss
John & Barb Sullivan
Jonathan Thibault, Lynn Housing Authority &
Neighborhood Development
Patrick Toomey
Linda Vaughan
Andrea Viglas
John Coleman Walsh
Patricia Warren, St. Jeans CU
David Wescott, Instant Alarm
Dale Yale, Salem Planning Board
David Zaltman
Manny Zhukovsky
Tamara Zhukovsky
Anthony Zihertu

Public Meeting #2 Summary
Lynn

Route 107 Corridor Study Public Meeting #2: Summary

March 9, 2016 – 6:00 PM

Lynn English High School Auditorium, 50 Goodridge Street, Lynn, MA

Project Team

Michael Clark, Massachusetts Department of Transportation (MassDOT), Office of Transportation Planning (OTP); Maureen Chlebek, McMahon Associates; Kate Barrett and Sarah Paritsky, Regina Villa Associates (RVA).

Present

The following elected officials or their designees attended, plus members of the public (see attendance):

- Mayor Judith Flanagan Kennedy, City of Lynn
- Dan Cahill, Lynn City Council
- Brian LaPierre, Lynn City Council
- Wayne Lozzi, Lynn City Council
- Bill Trahant, Lynn City Council
- Stephanie Raymond, Office of Senator Joan Lovely
- Meaghen Hamill, Office of Senator Thomas McGee

Meeting Purpose

This was the second public information meeting on the Route 107 Corridor Study. The purpose of this meeting was to introduce the study to City of Lynn residents. The study team encouraged participants to provide feedback on the study framework and work completed to date. The presentation shown at this meeting is posted on the project website at: www.mass.gov/massdot/Route107

Meeting Summary

Welcome and Introductions

Kate Barrett, RVA, opened the meeting, reviewed the meeting guidelines, and introduced the presenters. She asked participants to hold questions until the end of the presentation, when she would moderate a question and answer session. MassDOT Project Manager Michael Clark reviewed the agenda, and introduced elected officials present at the meeting.

Mr. Clark reviewed the study process and outlined the five study tasks. The study has progressed to the end of Task 3: Evaluate Existing Conditions and Identify Transportation Issues. The first public meeting was held in Salem on January 27. There will be two more Working Group meetings and one more round of public meetings before the study is completed. Mr. Clark introduced the study consultant team of

McMahon Associates and RVA. Mr. Clark explained the role of the Working Group, which consists of local and state officials, business organizations, residents of Lynn and Salem, and other stakeholders.

Mr. Clark said an online survey was available for four months and gathered over 1,672 responses on issues and opportunities for motorists, pedestrians, transit riders, and bicyclists in the corridor. He noted the results of the survey indicate that MassDOT's existing conditions findings are consistent with the community's understanding of corridor issues. More details are available in the survey report, which is available on the study website.

Mr. Clark introduced Maureen Chlebek, McMahon Associates, who described the goals of the study. The primary goal is to improve mobility, connectivity, and safety for all transportation modes and users along the corridor. She presented the criteria used to help the study team evaluate alternatives.

Existing Transportation Conditions

Ms. Chlebek explained that the study area, which extends from Chestnut Street in Lynn to Boston Street in Salem, includes 15 key intersections. While 35% of the roadway is under local jurisdiction (at the far north and south ends of the corridor), 65% is under MassDOT jurisdiction.

Ms. Chlebek described the study's data collection effort to better understand existing traffic conditions. The team collected automatic traffic recorder (ATR) counts and turning movement counts for vehicles, pedestrians, and bicycles during the weekday morning (AM) and afternoon (PM) peak periods and Saturday midday peak periods at the 15 study area intersections. Vehicle counts were fairly consistent for northbound and southbound traffic. The highest vehicle volumes are between Swampscott Road and Marlborough Road.

Ms. Chlebek said that while bicycle counts were very low (zero to two bicyclists per peak hour), she does not interpret that to mean there is low demand. The roadway conditions make bicycling a challenge. Ms. Chlebek identified the five intersections with the highest pedestrian volumes, which were concentrated in the southern portion of the corridor. McMahon examined origin/destination data to better understand the zig-zag movement of vehicles between Swampscott Road, Route 107/Highland Avenue, and Marlborough Road. Ms. Chlebek explained that five out of the 15 intersections have a crash rate higher than the MassDOT average; three are listed on the top 200 crash intersections in Massachusetts. McMahon is looking at data to see if there are patterns or problems that could be alleviated as a result of the study.

Ms. Chlebek provided an overview of existing transit conditions. The study area overlaps with three Massachusetts Bay Transit Authority (MBTA) bus routes – the 424, 450, and 456 – which vary in service, ridership, and frequency. Ms. Chlebek noted that some stops have a particularly low volume of passengers boarding and alighting buses, while others are missing a corresponding stop on the other side of the road.

Ms. Chlebek described maps that her team has developed for land use, zoning, environmental resources, environmental justice, and cultural and historical resources.

Traffic Operations

Ms. Chlebek explained that traffic engineers assign an overall level-of-service, ranging from A to F, to each intersection to evaluate its capacity and operations. A level-of-service rating of "D" is acceptable for MassDOT standards, but "E" or "F" ratings are problematic. Ms. Chlebek said this rating is one tool

and does not tell the whole story. For example, the team has also looked at the queue lengths (the number of stacked vehicles) at major intersections and whether the queues extend to adjacent intersections.

Future Year Traffic Volumes

Ms. Chlebek emphasized the importance of making long term improvements on the corridor to serve future traffic volumes. The Central Transportation Planning Staff (CTPS) predicted 0.1% to 0.3% traffic growth per year between 2015 and 2035. Ms. Chlebek explained this data is based on historical data, future population and employment projections, and known developments in the permitting stage. The study team was made aware of the high level of community concern about the proposed Cinemaworld development proposed near Ravenna Avenue and Cedar Drive. As a result, the study team will account for the proponent's projected traffic data and proposed traffic mitigation. Ms. Chlebek said the study team will make sure the development would not preclude any design recommendations resulting from the study.

Transportation Issues/Deficiencies

Ms. Chlebek presented the findings on transit deficiencies, which include low ridership, close bus stop spacing, and missing matching stops. While the MBTA guidelines calls for spacing between stops of between 750 and 1,350 feet, 30 stops along Route 107 are less than 750 feet apart, which suggests these stops could be managed differently. Many bus stops are missing pedestrian amenities, such as sidewalk connections.

Ms. Chlebek reviewed pedestrian deficiencies along the corridor, including poor sidewalk conditions and missing crosswalks and curb ramps. She described the catalog of pedestrian amenities the team has compiled, and provided an example of pedestrian conditions in Salem.

Ms. Chlebek provided some background on the cyclist population. Any proposed improvements aim to draw from the "interested but concerned" population (about 60% of the overall population who are interested in cycling but may not be willing to do so in all conditions). McMahon rated bicycle conditions throughout the corridor using a level of traffic stress (LTS) 4 measure, which is the highest level of stress and based on conditions such as proximity to vehicles. The study team hopes to improve the LTS to a LTS 3, or even LTS 2 in some spots.

Ms. Chlebek reviewed vehicular deficiencies, including queuing that inhibits movements from adjacent intersections, signal issues, and pavement conditions. The study team divided the corridor into four segments and focused on vehicular deficiencies in each area, which Ms. Chlebek subsequently presented, from south to north:

- Segment A – lack of signal coordination, high crash locations, turning lanes, queueing issues, old signal equipment
- Segment B – access management, roadway debris, wide crossings, queueing issues, missing sidewalks/crosswalks
- Segment C – vehicle progression, queue storage, signal coordination, roadway debris, high speeds, illegal U-turns
- Segment D – pavement markings, queue storage, access management, missing crosswalks

Next Steps

Mr. Clark described next steps for the Route 107 Corridor Study. The study team is developing recommendations for improvements, with input from the Working Group, and will evaluate those improvement concepts and estimated costs. At the second round of public meetings, the study team will share its recommendations for public feedback before writing the final report. Mr. Clark noted that the recommendations will not move forward into construction without community support. He encouraged attendees to visit the project website to sign up for emails and download the meeting presentation and summary.

Question & Answer Session

Ms. Barrett reviewed the meeting guidelines pertaining to the Q&A. She asked if any elected officials would like to ask questions or make comments. Mayor Kennedy spoke first, specifying that her comments were more as a resident along Segment B, than as Mayor of Lynn. She stated that if the traffic counts were taken during the summer, the counts would be far lower than when schools, which are located in close proximity to Route 107, are in session. Mayor Kennedy said she lives on Buchanan Circle, north of Route 107, and she and her neighbors have tried for years to get an on-demand signal installed at that intersection. She said it once took four minutes for her to turn left from Buchanan Circle onto Route 107 and there are no other outlets from her neighborhood. Mayor Kennedy added that there are many accidents turning left onto Route 107 from Stanwood Street. She proposed the idea of changing Stanwood Street to one-way traffic westbound.

At-Large Councillor Dan Cahill expressed his concerns regarding safety, the condition of sidewalks on Route 107 and debris near his residence. He said he is very grateful this study will propose improvements and hopes funding will be made available to implement them. He understands the difficulty in managing the different jurisdictions for sections under MassDOT control and those under City control, for instance at the “floating” bridge. Mr. Cahill thanked Senator McGee for working with the study team to expand the study area. He added that the closure of Union Hospital in Lynn could make traffic worse around North Shore Medical Center (NSMC), and asked MassDOT to coordinate with the Department of Public Health (DPH) about this study. It’s a safety and economic development issue.

Ward 2 Councillor Bill Trahant said he has witnessed many accidents on Route 107 and a young woman was killed as a result of an accident about a year ago. He suggested installing a signal at the intersection of Stanwood Street and Western Avenue (Route 107). Mr. Trahant thinks making Stanwood Street one-way could negatively affect other roadways by creating a bottleneck back to the rotary. He asked if the team can make any immediate changes to reduce queuing. Ms. Chlebek said the study’s final report will propose short-term improvements, including signal coordination, which could be rolled out as early as this summer.

At-Large Councillor Brian LaPierre explained he thinks the CinemaWorld development will be very difficult for traffic management on Route 107. He thanked Senator McGee for his work and said he appreciates the collaboration between the state and the City of Lynn.

Bill McGuinness said he has been a Lynn resident for over 82 years. He expressed concerns about the DPH hearing on the closure of Union Hospital and believes DPH is assuming the improvements that result from this study will relieve any traffic problems with higher volumes generated by patients and visitors who are shifted to NSMC. He added that there are issues in Salem affecting Lynn’s segment of roadway, such as the CinemaWorld development.

Peter Vanamburgh said he lives on Euclid Avenue and expressed concern about cut-through traffic. He believes quality of life is the biggest issue, though safety is also important. He thinks traffic has a significant negative impact on a good neighborhood.

Cecile Fanti stated that she is a resident of Buchanan Circle. She can no longer drive and likes to walk but it is difficult, especially when sidewalks are not plowed. Ms. Fanti emphasized the importance of good lighting for pedestrians, and walk signals at crosswalks. Areas without sidewalks are problematic for those who choose to or have to walk. She added that since U-turns are not allowed at any intersections, drivers use Buchanan Circle to turn around.

Patricia Demirdjiah suggested adding a guard rail along the median into Salem. She noted that northbound vehicles stop to make an illegal left turn into the Campfire campground. This causes other drivers to swerve around them. She expressed concern that if U-turns aren't permitted, people will use Buchanan Circle to turn around.

Calvin Anderson, who lives on Concord Street, is concerned about the area around Waitt Street. He proposed introducing service roads to connect shopping centers and avoid too many curb cuts. He expressed concern with MassDOT's maintenance of its infrastructure.

Donna Marrama said she lives on Western Avenue at the bottom of a hill. Drivers don't see the signal until they reach the top of the hill, so she suggested MassDOT add a signal warning sign at the bottom of the hill. She expressed concern about the volume of tractor trailer trucks that go to Walmart and that they travel at very high speeds. She does not want Route 107 to turn into a roadway with characteristics similar to Route 114. Ms. Marrama also suggested installing a sign at the top of the hill near Chestnut Street because the signal is not visible at the bottom of the hill.

Elena Kirios explained that she lives near the intersection of Eastern Avenue and Western Avenue. She is happy to hear about the study. Ms. Kirios expressed concern regarding the high speeds of drivers turning from Route 107 onto Eastern Avenue. She asked if a signal could be added at the intersection. She added that parking is allowed on both sides of Eastern Avenue impacting sight lines and making it very difficult for her and her neighbors to safely back out of their driveways. She suggested adding speed bumps to slow drivers down. Ms. Kirios also shared concerns regarding bicyclists and motorcycles, cars exiting from gas station driveways, and noise. She also noted that beach traffic causes problems at Waitt Avenue and the triangle area of Eastern Avenue, Waitt Avenue, and Western Avenue should be dealt with.

Barbara Kinney said she lives on Fernwood Avenue and experiences "gridlock" due to traffic on Western Avenue and schools. She is concerned if Stanwood is made one-way westbound, traffic could get gridlocked on Chase Road and cause problems on Euclid Avenue. She requested MassDOT install a sign to prevent using local side streets to cut-through during commuting hours. She noted that bikes currently use sidewalks on Western Avenue. She urged MassDOT to consider improvements to Route 107 south of the study area boundary.

Toso Nikolakopoulos stated that he owns John's Roast Beef and some properties on Western Avenue. The businesses rely on on-street parking. Mr. Nikolakopoulos asked MassDOT to maintain all on-street parking, which is crucial to his business customers and employees. He noted that he is a member of the Lynn Chamber of Commerce and Commissioner of Off-Street Parking.

John Wilson, Lynn Area Chamber of Commerce, read an excerpt from a letter that discourages MassDOT from eliminating any on-street parking. He noted that he has also experienced traffic due to construction and asked that MassDOT keep the traffic moving during construction of any improvements resulting from the study. Mr. Clark explained that during these studies, MassDOT keeps an open mind to all potential options, and had proposed a concept to the Working Group for feedback that eliminated portions of on-street parking. The Working Group confirmed that would not receive public support and the study team will not be advancing this idea forward as a recommendation. While it is ultimately the City's decision, the study may find that one or two spaces may need to be removed to accommodate safety improvements at certain intersections. The Working Group and public will be consulted on all potential parking removal proposals.

Jean Hart, a resident of French Street, said she avoids the Western Avenue area. She believes that no improvement could alleviate potential traffic effects of the proposed Cinemaworld development. Mr. Clark explained that this concern came up at the public meeting in Salem. He explained that once the proponent of the development submits an application for a curb cut permit to MassDOT, which has not yet occurred, MassDOT could approve or disapprove it. MassDOT would analyze the projected traffic impacts and proposed mitigation to ensure it would not overload the roadway. The decisions regarding land use and quality of life effects on the community rest with the City of Salem. MassDOT only evaluates impacts to its infrastructure and that is reviewed by engineering staff. Mr. Clark was not sure how the City of Lynn would be involved with this decision-making process. Ms. Hart was interested in knowing the correlation between closing Union Hospital and opening the Cinemaworld development.

Ed Mollett, a resident of Waitt Avenue, expressed his support for a traffic light at Stanwood Street and at Eastern Avenue. Light timing will be important. He has experienced traffic from Walmart all the way down to Waitt Avenue. He does not think making Stanwood one-way would improve traffic.

Patricia Liberti, an Olde Village Drive resident of Salem, shared her concerns with the potential traffic resulting from the proposed Cineplex and also the number of one-way streets between the 400 Highland residential complex and Barnes Road/Ravenna Avenue. An additional traffic signal for the development would create a close concentration of traffic lights.

Donna Kennedy said she lives on Westview Road and is aware of multiple undeveloped, commercially zoned parcels in Salem. She asked if the study has looked at the potential impact of these developments and traffic generated should they be developed in the future. Ms. Chlebek explained the study team has coordinated with the cities to understand all formally proposed developments. It is hard to predict traffic impacts for something that has not been proposed when the type of use is unknown, but the study team has looked at land use maps, population growth rates, and employment projections. Ms. Kennedy suggested that the projections are not adequate given the potential for development. She does not want Route 107 to become similar to Route 114. Ms. Kennedy added there is only one way in and out of her neighborhood and asked for an on-demand signal. She also noted that lane markings are needed, and she has seen many vehicles speeding on Route 107.

Karen Maliansk said she lives on Western Avenue and believes traffic and truck convoys are major problems. She has trouble accessing her driveway and sight lines are blocked by parked vehicles. Traffic speeds are too high. South of Chestnut is also a problem. She generally has concerns about quality of life, health, congestion, and safety concerns.

An attendee expressed interest in three lanes in each direction between the floating bridge and fire station in Salem to adequately prepare for growth. He suggested using land acquisition or whatever is needed to widen the roadway. He stated that land acquisition would be the only way MassDOT can solve the problem between 400 Highland and NSMC.

Deborah Smith Walsh said she lives near the Mayor and reiterated some of the previous comments. She expressed her support for a traffic light at Buchanan Circle. She said the light at Fays Avenue must stay. Ms. Walsh thanked the study team for holding a meeting in Lynn and requested that the next meeting to be held in the City.

John Coleman Walsh added that it is difficult to see drivers on Western Avenue at Highland Avenue. He also noted that it's hard to see cars near Belleaire Avenue where drivers speed up the hill, and trucks are a concern. He, too, would like the study team to hold another meeting in Lynn.

Ms. Barrett thanked everyone for attending and providing comments, and closed the meeting.

Attendance

Calvin Anderson
Steve Archer
John and Colleen Barry
Matt Breen
Joy Campbell
Leslie Cartemanche
Mr. and Mrs. Roger Chia
Norm Cole, Lynn Housing Authority and Neighborhood Development
Patricia Demirdjiah
June DeRoin
Michael Dollard
Sean Donahue, Lynn Community Television
William Erwin
Nevelle and Dale Faly
Cecile Fanti
Peter Frangipane
Alex Freedman, Mass in Motion
Jill Frucci
Darlene Gallant, LEO
Andrea Gayle-Bennett
Alexander Gershaw
K Gobichaud
Jean Hart
Mary-Kate James, Vanasse and Associates
Robert Jesionowski
Helen Jesionowski
Donna Kennedy
Susan and Robert Kerni
Barbara and Shawn Kinney
Elena Kirios
Pat Lee
Pat Liberti, Ward 4/Gallows Hill Neighborhood Group
Jill Madigni
Brenda Maillet
Ivan Maillet
Karen Maliansk
Donna Marrama
Juor McCarthy
Bria McCarthy
William McGuinness
Gloria Minny
Ed Mollett
Jean Mulhern
Carol Noble
Tom O'Hare
John Olson
Toso Nikolakopoulos
Rebecca Potter
William Rafuse
William Reilly
Bill and Sherry Roberson
Marty Robichaud
Bill Rogers, City of Lynn
Edward Shinnick, Lynn Police Department
Deborah Smith Walsh, Lynn Community Health Center

Anthony Spence
Karyl Stoa
Martin Sullivan
Nesly Telfoht
James Tozza
Linda and Steve Upton
Peter Vanamburgh
Kathy Veilleux
Beverly Weaver
Lorry and Richard Willis
John Wilson, Lynn Area Chamber of Commerce
Kimberlee Worth

Public Meeting – Second Round Summary
Lynn/Salem

Route 107 Corridor Study – Second Round of Public Meetings: Summary

September 7, 2016 – 6:00 PM
Lynn English High School Auditorium
50 Goodridge Street, Lynn, MA

September 13, 2016 – 6:00 PM
Collins Middle School Auditorium
29 Highland Avenue, Salem, MA

Project Team

Michael Clark, Massachusetts Department of Transportation (MassDOT), Office of Transportation Planning (OTP); Jason Adams and Maureen Chlebek, McMahon Associates; Kate Barrett, Emily Christin and Sarah Paritsky, Regina Villa Associates (RVA).

Present

The following elected officials attended, plus members of the public (see attendance):

September 7

- State Representative Dan Cahill
- Wayne Lozzi, Lynn City Council

September 13

- State Senator Joan Lovely
- State Representative Paul Tucker
- David Eppley, Salem City Council
- Stephen Lovely, Salem City Council
- Elaine Milo, Salem City Council

Meeting Purpose

The purpose of these meetings was to present the team's draft recommendations and gather additional input, prior to issuing the Final Report. The recommendations are the result of a comprehensive evaluation of a number of alternatives to improve the Route 107 corridor. MassDOT and its team carefully considered input from the Working Group, general public, and the public survey results. Various factors were considered in arriving at the recommendations, including projected traffic volumes for known existing conditions and potential future development, and options for improving bike and pedestrian accommodations. The study team encouraged participants to provide feedback on the recommendations and work completed to date. The same presentation was given at both meetings, and can be reviewed on the project website at: www.mass.gov/massdot/Route107. The September 13 meeting in Salem was the final public meeting for the Route 107 Corridor Study.

Meeting Summary

Welcome and Introductions

Kate Barrett, RVA, opened the meeting and reviewed the meeting guidelines. She asked participants to hold questions until the end of the presentation, when she would moderate a question and answer session.

MassDOT Project Manager Michael Clark reviewed the agenda, introduced project team members Maureen Chlebek and Jason Adams, McMahon Associates, and Sarah Paritsky, RVA. Mr. Clark introduced elected officials present at the meeting and provided an opportunity for comments, as he knew they needed to leave for another meeting.

Rep. Dan Cahill thanked MassDOT for conducting the study and including the portions in Lynn. He announced that he and Rep. Tucker were able to secure funding in the economic development bill to pay for the implementation of some of the study recommendations.

Study Process

Mr. Clark described the study process and area, which includes 15 key intersections in Lynn and Salem. Mr. Clark outlined the five study tasks and explained that the study began in spring 2015. Tasks 1 and 2 were presented at the March public meeting. When the Final Report is released, a 30 day public comment period will begin.

Mr. Clark said that there were four working group meetings at key steps in the process. He explained the role of the Working Group, which consists of local and state officials, business organizations, residents of Lynn and Salem, and other stakeholders.

Mr. Clark described the primary goals of the study: to improve mobility, connectivity and safety, support local economic development goals, and improve the quality of life for corridor residents and businesses. The study team developed evaluation criteria based on these goals, which helps the team evaluate improvements.

Survey Results[1]

Ms. Paritsky provided an overview of the online survey results. Ms. Paritsky said an online survey gathered over 1,670 responses on issues and opportunities for motorists, pedestrians, transit riders, and bicyclists in the corridor. She said the survey was available for about four months and was available in English and Spanish. Ms. Paritsky said about half of the respondents live in the corridor and a fifth work in the corridor.

Most respondents drive through the corridor; however, the responses to the survey indicated an interest in improving pedestrian and bicycle amenities to make it easier to walk, bike, and take the bus. Ms. Paritsky said the results of the survey were largely consistent with the team's existing conditions findings presented at the March public meeting.

Overall Improvement Alternative Concepts

Ms. Chlebek reviewed the project study area. At the last public meeting, the presentation focused on the deficiencies in the corridor – the poor condition of the sidewalks and the lack of bicycle facilities. This meeting will focus on improvements.

The corridor is served by MBTA Bus Routes 424, 450, and 456. Ms. Chlebek said the study team found that there are many bus stops with low volumes of users. Without losing transit users, the bus stops could be relocated strategically to increase the efficiency of the transit service. Pedestrian improvements will include adding marked crosswalks, curb extensions to shorten crosswalks, and countdown pedestrian signals. Ms. Chlebek explained that at the last meeting, the project team

[1] Ms. Barrett presented the survey results at the September 13 meeting.

described how it assigned the corridor a Level of Traffic Stress (LTS) 4 for cyclists, indicating high stress conditions. Ms. Chlebek described vehicular improvements, which include traffic signal upgrades, exclusive turn lanes (especially at high-crash rate intersections), corridor-wide signal coordination, reducing the number of curb cuts, and traffic calming to reduce speeds. Some vehicular improvements, such as changes to traffic signals, could be implemented in the short term.

Ms. Chlebek identified three unsignalized intersections that meet the criteria for a signal: Route 107 at Stanwood Street and Eastern Avenue, Swampscott Road at First Street, and Route 107 at the Salem Hospital Lower Entrance.

What is a Cross-Section?

Ms. Chlebek explained that cross-sections are the framework for how the study team developed improvement alternatives, with help from the Working Group. She outlined each element of a cross-section, providing travel space for vehicles, pedestrians, and cyclists, as well as parking and buffer space. She described how the study team applied a cross-section to the Lynn Corridor Segment (which has 66 feet of right-of-way (ROW)), the Retail Corridor Segment (90 feet of ROW), and the Salem Corridor Segment (60 feet of ROW). The goal is to accommodate land use and needs and find the mix that best fits each segment.

Segment by Segment Improvements

Ms. Chlebek described some design considerations, including cost, feasibility, property and ROW boundaries, and constructability. She noted that the improvements she and Mr. Adams are presenting are conceptual plans only. Once the plans are funded, they move to the engineering phase where detailed designs are developed.

Summary of Changes in Lynn Corridor Segment (Parking Both Sides + Bike Lanes Cross-Section)

Mr. Adams said the study team developed three roadway cross-sections for the Lynn Corridor Segment: one with parking on both sides plus bike lanes, another with parking on one side and buffered bike lanes, and a third that eliminated parking and added a two-way separated bike lane. The Working Group prioritized maintaining parking whenever possible, so the team moved forward with the cross-section that maintained seven-foot parking lanes on both sides, 11-foot travel lanes, and 5-foot bike lanes. Mr. Adams described the improvements proposed to the corridor and each intersection:

- Provided bicycle accommodations throughout segment
- Improved pedestrian accommodations through sidewalk replacement to meet the Americans with Disabilities Act (ADA) standards
- Enriched transit accommodations by providing ADA-compliant bus stops and adjusted bus stop locations for efficiency
- Increased safety with left turn lanes and reduced lane width to slow traffic speeds
- Improved vehicle operations with added capacity and signal timing/coordination improvements
- Identified opportunities for access management (minimizing curb cuts)
- Minimized parking impacts to extent possible

Intersection-Specific Improvements:

Route 107 at Chestnut Street

- Existing conditions: This four-way intersection has crosswalks but no left turn lanes.
- Proposed improvements: Bike lanes and bike boxes (which help increase visibility by placing cyclists ahead of vehicles at signals) were added in both directions, bus stops relocated, sidewalks added, left turn lanes added to all approaches, and signal coordination improved. Some parking spaces are removed in order to create the left turn lanes and to reduce conflicts in close proximity to the intersection.

Route 107 at Chatham Street

- Existing conditions: This intersection has similar conditions to Route 107 at Chestnut Street, as well as no delineated parking spaces.
- Proposed improvements: Left turn lanes were added to all approaches; therefore, some parking was removed, signal coordination improved, and bus stops relocated. There is an opportunity to improve access management by combining driveways.

Route 107 at Eastern Avenue/Stanwood Street & Route 107 at Waitt Avenue/Maple Street

- Existing conditions: These two intersections produce conflicting traffic movements, have no turn lanes, and high crash rates.
- Proposed improvements: The improvements at both intersections play off of one another, and include left turn restrictions from Route 107 to Waitt Avenue and from Eastern Avenue to Route 107; left turn lanes added to Maple Street, Waitt Avenue, and Route 107 southbound; a traffic island with plantings on Eastern Avenue; relocated bus stops; and improved signal coordination. The majority of the parking is maintained.

Route 107 at Fays Avenue

- Existing conditions: This signalized T-shaped intersection is constrained by ledge and the residences close to Route 107 and has poor sidewalks.
- Proposed improvements: A relocated bus stop provides a level landing at rear and front doors, improved sidewalk, new buffered bike lanes, a new crosswalk, and improved signal timing/coordination.

Parking Impacts – Lynn Corridor Segment

- There are 130 existing parking spaces.
- 97 parking spaces are proposed, with a net loss of 33 spaces to improve safety and operations of the intersections.

Route 107 Corridor Transition at Lynn/Salem border

- Existing conditions: The southbound transition from two travel lanes to one travel lane at the Lynn/Salem border occurs suddenly.
- Proposed improvements: Maintained buffered bike lanes, lengthened the transition from two lanes to one lane, and replaced the guardrail with a landscaped median.

Summary of Changes in Retail Corridor Segment (Four Lane Roadway + Median + Buffered Bike Lanes Cross-Section)

Ms. Chlebek explained that the Retail Corridor has 90 feet of ROW, far more than the other two corridor segments. There are also particularly high traffic volumes through this area, so four travel lanes are needed. The team considered two cross-section concepts: 1) a four lane roadway plus median plus buffered bike lanes, and 2) a four lane roadway plus shared-use path. Ms. Chlebek explained that the Working Group expressed its preference for the first concept, which maintains the median. She described the improvements proposed to the corridor and each intersection:

- Added buffered bicycle lanes through most of segment
- Improved pedestrian accommodations by adding pedestrian crosswalks at key intersections and missing links of sidewalk on the west side of Route 107
- Enriched transit accommodations by providing ADA-compliant bus stops and adjusted bus stop locations
- Increased safety by reducing lane width to slow traffic speeds
- Improved vehicle operations through signal installation and signal timing/coordination improvements
- Provided aesthetically pleasing median

Intersection-Specific Improvements:

Route 107 at Walmart Drive

- Existing conditions: Lack of sidewalk and pedestrian crossings, with a southbound right-turn-only lane.
- Proposed improvements: Eliminated southbound right-turn-only lane, added crosswalks and sidewalks, removed guardrail, added planted median (which terminates for a left turn lane), added buffered bicycle lanes, relocated bus stops to provide level landing at rear and front doors, and improved signal timing/coordination.

Route 107 at Olde Village Drive

- Existing conditions: Lack of sidewalk on one side of Route 107 and only one pedestrian crossing.
- Proposed improvements: Added two crosswalks and sidewalks to both sides of Route 107, replaced guardrail with planted median, added buffered bicycle lanes, and improved signal timing/coordination.

Route 107 at Barnes Road

- Existing conditions: Lack of crosswalks and sidewalks.
- Proposed improvements: Added crosswalks and sidewalks, replaced guardrail with planted median, added buffered bicycle lanes, relocated bus stop, and improved signal timing/coordination.

Zigzag Segment

Mr. Adams described the zigzag traffic movement – a connection between Marlborough Road and Swampscott Road that crosses over Route 107 and connects to Traders Way and First Street. The study

proposed a short-term improvement to improve traffic flow on these roads. After evaluating more than 10 alternatives with Working Group guidance, the study team looked at four alternatives to keep vehicles on Route 107 (through a widened ROW). Mr. Adams described the alternatives:

- Short-term improvement: Full Access – Signalize the intersection of First Street and Swampscott Road, improve signal coordination, reallocate green light timing for more traffic flow.
- Alternative 1 (removed from further consideration): Dual left turn at Swampscott Road and Marlborough Road – two buildings would be impacted and ledge and grade changes would restrict construction.
- Alternative 2 (removed from further consideration): Marlborough Road roundabout and dual left turn lanes at Swampscott Road – significant building and private property impacts.
- Alternative 3 (removed from further consideration): Marlborough Road roundabout shifted toward CVS with northbound and southbound by-pass lanes and dual left turn lanes at Swampscott Road – significant building and private property impacts.
- Alternative 4 (removed from further consideration): Swampscott Road at Highland Avenue intersection relocation – easier for vehicles to access Route 107, but impacts Forest River.
- Preferred long-term improvement: No connection between Marlborough Road and Swampscott Road via Route 107 – This alternative appears to improve operations and reduce vehicle queuing on Route 107, Marlborough Road, and Swampscott Road, but further study of impacts to First Street, and Traders Way is recommended. Turn restrictions would require some type of physical lane barrier.

Route 107 at Swampscott Road

- Existing conditions: Vehicle queuing, missing crosswalks and sidewalks.
- Proposed improvements: Lane barriers added, same number of lanes maintained, tailored bike lane (not buffered due to limited space), installed landscaped median and islands, remove existing bus stop.

Route 107 at Marlborough Road

- Existing conditions: Vehicle queuing, missing crosswalks and sidewalks.
- Proposed improvements: Same number of lanes maintained on Route 107, lanes rearranged on Traders Way and Marlborough Road with added capacity, operational and safety improvements, added lane barriers, relocated and added bus stop, and added two-stage bike boxes (allows bike to make left turns in two movements for improved safety).

Swampscott Road at First Street

- Existing conditions: Existing unsignalized intersection.
- Proposed improvements: Added signal and sidewalk, extra lane on First Street, added an approach lane and a receiving lane on the Swampscott Road northbound approach, improved traffic operations, and crosswalk.

Route 107 at Hawthorne Square Mall

- Existing conditions: Only one through lane on Route 107 southbound, exclusive right-turn lane, missing crosswalk.

- Proposed improvements: Converted right-turn-only lane into shared lane, added buffered bicycle lanes and two-stage bike boxes, relocated bus stop for better retail area access, added medians, and improved signal timing/coordination.

Route 107 Corridor Transition at Crowdis Street

- Existing conditions: Lanes are not well-defined and merge happens quickly.
- Proposed improvements: Defined lanes with painted markings, lengthened transition from two lanes to one lane heading north, added bicycle lanes, removed existing bus stops, and replaced guardrail with landscaped median.

Summary of Changes in Northern Corridor Segment (Two-Way Left Turn Lane + Bike Lanes Cross-Section)

Ms. Chlebek explained that the study team originally considered three cross-section concepts – a two-way left turn lane plus bike lanes, a two lane road plus two-way separated bike lane, and a two lane road plus shared-use path. With feedback from the Working Group, the team moved forward with the two-way left turn lane plus bike lanes cross-section. She described the improvements proposed to the corridor and each intersection:

- Added bicycle provisions throughout segment
- Improved pedestrian accommodations by replacing sidewalks and adding crosswalks
- Enriched transit accommodations by providing ADA-compliant bus stops
- Increased safety by reducing lane width to slow traffic speeds
- Improved vehicle operations by adding capacity via exclusive turn lanes, a two-way left-turn lane, installing a signal at Salem Hospital Lower Entrance, and optimizing signal timing/coordination

Intersection-Specific Improvements

Route 107 at Willson Street

- Existing conditions: Unclear lane striping, and very narrow ROW due to pedestrian bridge in front of high school.
- Proposed improvements: Maintained two lanes in each direction due to traffic volumes, dropped bike lane for a short distance (see below), installed pavement markings to define lanes and use sharrows for bike/vehicle shared lane, relocated bus stop.
- Bicycle lane alternative: The Working Group suggested using high school property to take the bike lane off Route 107 in this area. The study team thinks this idea is worth further investigation and would need to be coordinated with the City of Salem.

Route 107 at Salem Hospital Lower Entrance

- Existing conditions: No traffic signal and lack of crosswalks and sidewalk.
- Proposed improvements: Added new traffic signal, a two-way left turn lane, painted median, bike lanes, and crosswalks and sidewalk.

Route 107 at Dalton Parkway and Jackson Street

- Existing conditions: Unclear signage for left turn restriction from Dalton Parkway and lack of crosswalks.

- Proposed improvements: Better defined median space (including added islands) to force vehicles to turn right from Dalton Parkway to Route 107, added buffered bike lanes and two-stage bike boxes, added crosswalks, and improved signal timing/coordination.

Route 107 at Boston Street

- Existing conditions: There are a lot of traffic movements at this intersection and a lot of ROW.
- Proposed improvements: Redesigned so major movements continue as through-movements; raised shared streets to serve pedestrians, cyclists, and driveway access along Route 107; added buffered bike lanes and crosswalks; added left turn only lane, and available space in the shared street in front of the fire station for a monument or landscaping.
- Shared streets: Ms. Chlebek explained that a shared street is a textured, low-speed area where pedestrians and vehicles share the road and vehicles move very slowly. She showed some examples of shared streets and noted that through traffic stays on the roadway.

Study Summary and Next Steps

Mr. Clark explained that the improvements presented support the project goals, which are all related to the broader goals of MassDOT and the regional Metropolitan Planning Organization. This gives the improvements a stronger chance of being funded. Mr. Clark reviewed some approximate costs of the proposed improvements, which total $26 million. He noted the improvements can be packaged according to the community's desire and added that MassDOT's jurisdiction is only from the Floating Bridge to Greenway Road. Mr. Clark described MassDOT's project development process and noted this project is in the conceptual planning stage (Step II: Planning). At Step IV: Environmental Permitting, Design, and ROW Process, the public can provide more input on the detailed design.

Mr. Clark announced that the final report will be released later in September. A 30-day comment period on the final report will be announced. He encouraged interested attendees to sign up for project emails at the project website (www.massdot.state.ma.us/route107) to be notified when the final report is available, and when the presentation and meeting summary are posted.

Question & Answer Session (September 7)

Ms. Barrett reviewed the meeting guidelines pertaining to the Q&A and invited attendees to provide comments or ask questions.

Leslie Courtemande, a resident of Farrell Avenue in Lynn, stated that in her opinion, there are a lot of accommodations proposed for bikes rather than vehicles. She is not certain that the number of bike riders warrants so many improvements. She suggested that the bikes and pedestrians could share the sidewalk instead of separate lanes. Ms. Courtemande asked if a landscaped median would prevent crash damage as well as a guardrail in the median. Ms. Chlebek explained there would be a curb with the landscaping, which would take some impact and help prevent cars from passing over the median. The improvements are designed to lower travel speeds, which should help reduce crash rates. Ms. Courtemande added that it is difficult to change directions on Route 107 near the Walmart and suggested an access road be considered.

Mary Ann Murray asked where the funding will come from. Mr. Clark explained the funding source will depend on how the cities package the projects, but likely from the State Transportation Improvement Program (TIP). Ms. Murray said she doubts that a median with plantings would stop cars from crossing

the median in an accident. She asked if the traffic signals will allow emergency vehicles to pass through, and Ms. Chlebek said yes, this is part of the signal operations. Ms. Murray stated that the sidewalks are not accessible for wheel chairs and Ms. Chlebek said the improvements would complete missing sidewalks and each proposed crosswalk would have ramps at each end and at the bus stops. Pedestrian countdown signals also help make it easier for pedestrians to judge if they have time to cross the street during the current cycle or wait for the next one.

Mary Margaret Malone said she applauds the team's efforts on the Study. She said the area from Chestnut Street to Chatham Street is very residential and she thinks the bike lanes would be an improvement, but she is worried the 11- foot lanes are too narrow for cars and make it hard to turn across bike lanes. She noted that as the baby boomers are aging, it is important to keep as many bus stops as possible; walking a few extra blocks can be difficult. She asked that as many bus stops between Chestnut Street and Chatham Street as possible be maintained and that access for the visually impaired be improved.

John Barry, a resident of Stanwood Street, said he thinks the study team has some good ideas, but there is too much of a focus on bikes and he does not see many bicyclists in the corridor currently. He suggested the study team look into opening Linton Road to two-way traffic, near the Western Avenue/Eastern Avenue/Stanwood Street intersection. He also asked that the study team look at how the rotary off Stanwood Street is impacted by the recommendations, where traffic currently backs up.

Travis Wojcik, a resident of Peabody, thinks the improvements would enhance the look of the corridor and he thinks the 11-foot lanes are sufficiently wide. He asked if there would be increased signage for Route 107 north and southbound at Eastern Avenue. Mr. Clark said this would be considered during the design stage of the project. Mr. Wojcik asked if the team considered protected bike lanes with the cars parking between the bike lane and the travel lane. Ms. Chlebek said the Lynn Corridor Segment is narrow and too constrained for that configuration. Mr. Wojcik also suggested that an access road be created between the Walmart and Olde Village Drive. Ms. Chlebek said the team explored similar ideas, but not that area specifically. It's something Walmart would need to pursue.

Calvin Anderson said he was impressed with the proposed solution at the Stanwood Street and Maple Avenue intersections. He suggested the agencies work with the private sector, such as Meineke and Walmart, to resolve access issues by consolidating curb cuts. He said he drives the Zigzag Segment frequently and is in favor of roundabouts.

Patricia Demirdjiah, a resident of Coolidge Road, described an access issue with Scouts Camp. She thinks an access road should be provided. Currently, vehicles turning left from Route 107 northbound to the Camp and from the Camp to reach Route 107 northbound are cutting across lanes creating a safety issue. She asked how buffers with traffic stakes would be affected during the winter when roads are plowed. Mr. Clark explained that snow considerations would be discussed during the design phase.

Elena Kirios, a resident of Eastern Avenue, said she thinks left turn lanes are definitely needed but she has some concerns. First, she asked if there is enough room to pass buses that are pulled over in a through lane. Mr. Adams explained that parking and bike lanes are reduced or removed to give more space to buses and other traffic. Ms. Kirios said the left turn lanes are often too short to fit all of the cars. Mr. Adams explained that the team has considered the traffic volumes when proposing the size of the lane. Ms. Kirios described some concerns with rerouting traffic from Swampscott Street to First

Street and Traders Way, specifically access and traffic flow at the Eastern Bank or Shaws parking lots. Mr. Adams said these details will be examined during the design phase. Ms. Kirios said she is pleased with the proposal for the Eastern Avenue and Western Avenue intersection. She said this intersection and the Waitt Avenue intersection are very dangerous.

Peter Frangipane, a resident of Western Avenue, asked the study team to revisit the width and design from Eastern Avenue to the Salem line as he is worried about limited sight distances. He requested parking be restricted. He does not believe bicyclists would want to use Route 107 due to the narrow roadway and heavy industrial truck traffic from the Salem quarry. Snow piles further reduce road widths during the winter. Sidewalks are best and should be kept passable during the winter.

Melina [no last name provided], a resident of Stanwood Street, commented on the barriers off Stanwood Street. She said traffic backs up in the small rotary at Maple Street. She asked if the study team looked at prohibiting turns on Stanwood Street from Western Avenue, perhaps during rush hour. Mr. Adams explained that the rotary isn't in the study area so the team didn't specifically evaluate it, but is aware of the issues there. The team is trying to solve traffic in the area with left turn lanes and turn restrictions. He said the design phase will include an examination of impacts to residential streets.

Mike Dollard, a resident of Western Avenue, suggested moving bus stops to the other side of the intersections. Ms. Chlebek said some stops were relocated, but the MBTA has a process for moving stops and would hold separate public meetings before making any changes. Mr. Dollard said before any major changes are made at fire stations, the state should request input from the shift commander or captain, not just headquarters.

Bill Marnik, a resident of Chatham Street, said he appreciates the changes for bicyclists and sees some people riding bikes, but it is dangerous. He said it can be difficult to get to the Riverworks Credit Union where he works. Five-foot wide bike lanes is not excessive. Ms. Chlebek said the team has done bike counts and the data will be included in the Final Report. She acknowledged that volumes are low but that does not mean there is no desire to bike, just a lack of amenities.

Matt McCormack, a Lynn resident, said the sidewalks should be widened for use by people in wheelchairs and bicyclists. He asked what happens if a car breaks down and said he has witnessed many accidents at the Puleo's ice cream shop nearby. He suggested keeping the guardrails and said that the gravel trucks are very wide, so wider lanes are better as well as providing sufficient turning radius. Mr. McCormack said he is worried about travel lane and bike lane widths and asked about access to Route 129A/Eastern Avenue. Mr. Adams said traffic on Route 107 southbound would turn left on Eastern Avenue, but the specific movement will be fleshed out during the design phase.

Ms. Barrett thanked everyone for attending and providing comments, and closed the meeting.

Question & Answer Session (September 13)

Stephen Lovely, Salem City Council, said a lot of residents were concerned about what they read in the newspaper about the Zigzag segment, and he believes that shifting traffic through Traders Way is not viable. He asked the study team to take another look at Zigzag Alternative 4, and stated that the land impacted there mostly belongs to Salem's transfer station. He thanked MassDOT for their work, and offered help in obtaining funding.

David Jacobson, a resident of Brittania Circle, asked how many members of the Working Group were local residents. Mr. Clark said many members of the Working Group are local residents, and that many are in the audience tonight (several raised their hands). Mr. Jacobson said the Zigzag alternative benefits the drivers on Route 107, but not the local residents. He added that bike lanes should not be prioritized because he does not believe many residents would use them. Emphasis should be on access/egress to the shopping center and left turn lanes

Rep. Paul Tucker thanked MassDOT for its work and said many residents have been concerned for a long time about the traffic and safety on Route 107. He said he does not support the Zigzag alternative on Traders Way.

Dave Walsh, a resident of Orleans Avenue, said his street is the last street off Marlborough Road before Highland Avenue. He said the Zigzag segment would further impact residents on Marlborough Road, which is already difficult to pull onto from his street.

Dave Pelletier said he has ridden his bike on Route 107 for nine years, and is surprised no one on the project team has mentioned the hills, which are difficult to bike on. He recommends widening the sidewalks to make it more appealing for pedestrians because no one walks on it now. He said shared sidewalks in Salem would make more sense than bike lanes because of the hills, and that other roads like Route 129 or 1A would be more suited for bicycle lane improvements. He also requested that the design should avoid placing light poles in the middle of the sidewalk as they are now in some places.

Senator Joan Lovely said she is part of the Working Group and thanked MassDOT and the study team for all of their work in developing the concepts, but now the focus should be on what really works. She said she is opposed to the Zigzag segment, because it does not solve the problem of congestion and just relocates it.

Linda Ferraresso said she is opposed to the Zigzag segment, and doesn't think it would be good for big trucks to go down Traders Way as they already speed on Swampscott Road. Only delivery trucks should be allowed on Traders Way and First Street.

Eric Papetti said he understands that right now bike and pedestrian use is unattractive, but he is in favor of the proposed bicycle improvements. He urged the study team to make sure pedestrian and bicycle improvements are designed to attract the most users, since they will have to live with whatever roadway is built for the next 30 years. These modes of travel should be safe and welcoming. Development and redevelopment opportunities should incorporate facilities.

Laura [no last name provided] said she appreciates the work that MassDOT has done so far but is opposed to the Zigzag segment, and said it is a nightmare to try to leave Home Depot or PetSmart right now. Access/egress must be addresssed. She asked if there will be an analysis in the final report of what the study team looked at in developing the Zigzag alternatives. She also wants to know how the cost estimate and schedule were arrived at. Ms. Chlebek said the information will be in the final report.

Joan Gilman, a resident of First Street, said there are a lot of residential buildings on First Street and discouraged the team from going forward with the Zigzag alternative because of the impacts to residents.

William Legault, said the Zigzag segment will not work. He added that he supports the proposed bike lanes along the corridor, and has biked up and down Highland Avenue as he does not own a car. He said a lot of bicyclists would not mind the hills.

Kathleen Tone, a resident of Eclipse Lane, said she is relieved the city's representatives understand the Zigzag segment will not work. She asked the study team to reexamine the bike lanes and consider a shared sidewalk instead.

Becky Christie, a resident of Marlborough Road, said she lives across from the CVS on Marlborough Road. She is unsure how the expansion of Marlborough Road would affect her property. She is against the Zigzag, but in favor of widening Marlborough Road. She added that at 6:30 AM it takes her five minutes to cross the street to get to the CVS parking lot.

June DeRoin, a resident of Sophia Road, said drivers on Route 107 often block vehicles entering from Swampscott Road and if the Cineplex goes in there will be even more people on the road.

Brad Freeman, a resident of Marblehead, said a bike path is needed. The plows in the winter will spread salt and sand making it difficult for plants to grow in the median. He also said the landscaped islands make it more difficult for plows to turn around and navigate, and urged the team to think about plowing operations.

Nancy Gilberg, a resident of Aurora Lane, said she lives right next to the intersection of Traders Way and First Street. She said it takes her ten minutes to cross through this intersection now. She added that rerouting traffic for the Zigzag would add noise to the quiet neighborhood, which is a rarity in Salem. She likes the bike lanes, and asked how narrow the vehicle lanes would be with the proposed bike lanes along the corridor. Mr. Clark said it varies along the corridor, but most of the space being taken is from the existing shoulders and the travel lanes will be 11-feet, which is adequate for travel.

Paul [no last name provided], a resident of Tanglewood Lane, suggested the study team look into a flyover for the corridor. He said the elevated roadway would be for through traffic, and the lanes underneath would be for local access. He asked if the study team could include a comparison of a flyover to the current proposed alternative in the Final Report, including cost. Ms. Barrett said this would have to be looked at in the next phase of the project, if it advances.

Mindy Solomon said she manages several condos on Highland Avenue, and asked if the Cineplex was part of the study and if it impacted the design. Mr. Clark explained that the Route 107 Corridor Study was developed before the Cineplex was proposed and is a separate project. He said it's unclear if the Cineplex project will advance. The proponent needs to file an Environmental Impact Report with the Massachusetts Environmental Policy Act office, but has not done so yet. Nothing has been heard from the proponent recently. Any traffic numbers that the Cineplex had available were accounted for in this study.

Joseph O'Neil, a resident of Essex Street, said that Route 107 is a crucial corridor to the Metro-Boston area, and adding bike lanes could potentially decrease vehicular traffic. He added that highway lane widths are usually only 10 feet wide, so the proposed lane widths in the study are more than adequate for vehicles.

Dan Puopolo, a resident of Cavendish Road, said that adding a traffic light to the intersection of First Street and Swampscott Road is a great idea.

Drew Vector, a resident of Highland Condos, said that traffic on Route 107 has created a lot of aggressive driving and he often sees cars running red lights. He suggested adding cameras to the corridor for enforcement.

Don Collins said he was involved in a bike accident on the corridor. He also asked if there are any plans for ledge blasting. Ms. Chlebek said there are no plans for blasting at this point along the ROW.

Patricia [no last name provided], a resident of Lions Lane, said she cannot pull out of Olde Village Drive because of trucks speeding down the corridor. She said she saw an accident hold up traffic on Route 107 for six hours because there was no egress, and the intersection of Swampscott Road and Route 107 near the car dealership is very dangerous.

Laura [no last name provided] asked if the final report will include a section on cumulative impacts to the traffic. Ms. Chlebek said yes.

Councilor Lovely addressed the comments made earlier about the Cineplex, and said it is independent of MassDOT's study and the last he heard was that the property was on the market. He added that the City of Salem has an independent consultant looking at adding traffic lights to the intersection of Swampscott Road and First Street.

Artie Sullivan said the reduction of capacity on the northern corridor segment will increase traffic backups, and that Highland was turned from one to two turning lanes at Willson Road in the past because of this. He said the traffic will just find other routes to take. Other communities are making changes to traffic circulation, which is pushing more traffic into Salem. A comprehensive traffic management plan is needed.

A participant proposed that exiting traffic from Salem Hospital be relocated to Je\fferson Avenue, and only traffic entering the hospital use Highland Avenue.

Joan Gillman asked about the intersection of First Street and Traders Way, and asked if there are any plans to take land. Ms. Chlebek said the project team is proposing signal modifications, but further study is required to determine whether added capacity is needed at this intersection under the Zigzag turn-restriction alternative.

Alexandra said she is opposed to the Zigzag segment and told the team they should spend a day at the intersection of Swampscott Road and First Street to see the traffic conditions. She added that until recently, bicycles were only considered a recreational vehicle. She suggested the study team widen the sidewalks for shared use rather than add bike lanes where they would interact with vehicles.

A participant commented that sidewalk maintenance along Highland Avenue is a problem.

Ms. Barrett thanked everyone for attending and providing comments, and closed the meeting.

Attendance (September 7)

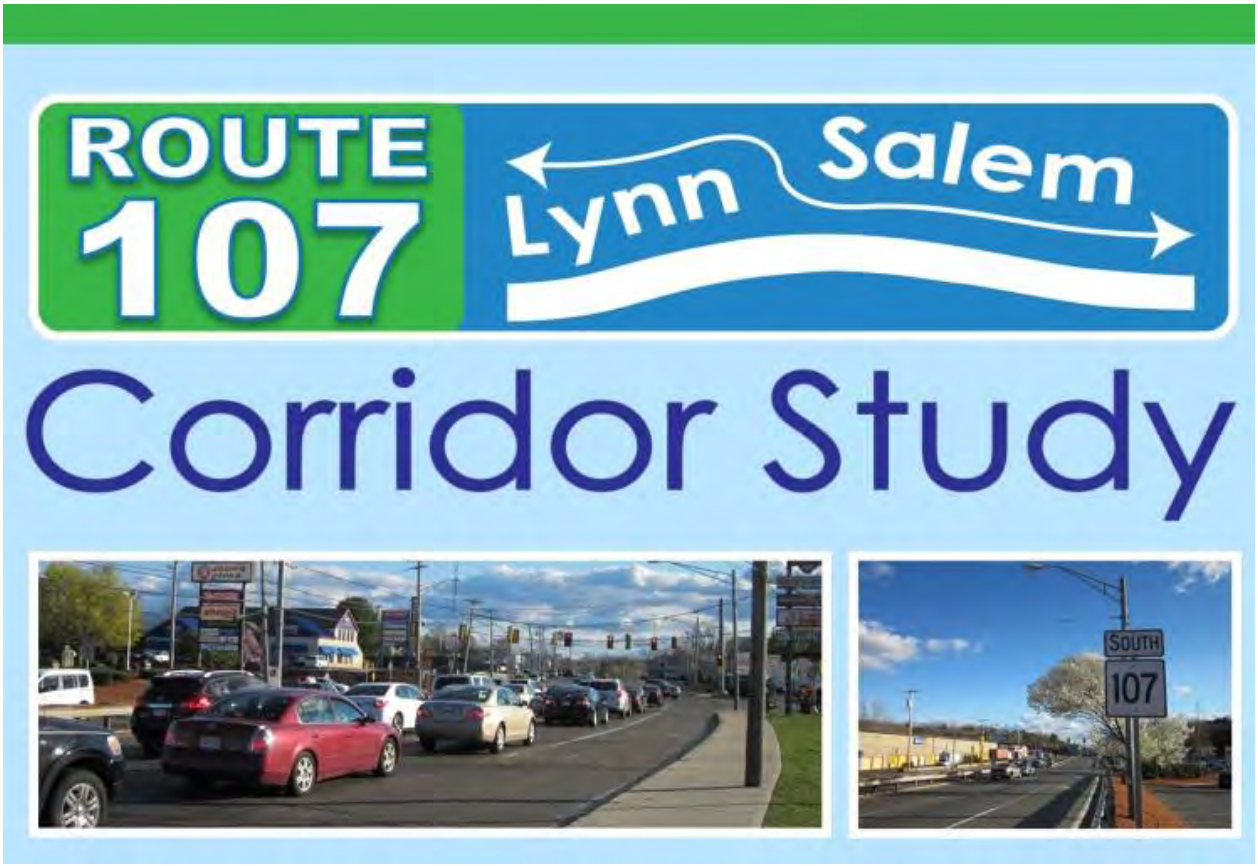
Calvin Anderson

John and Colleen Barry
Daniel Cahill, Lynn City Council
James Carroll
Norm Cole, LHAND
Leslie Courtemanche
Patricia Demirdjiah
Michael Dollard
Peter Frangipane
Alex Freedman, Mass in Motion
Darlene Gallant, LEO
Francine Goldstein
Stan Goldstein
Loretta Harriman, Lynn Food & Fitness/
Mass in Motion
Kevin Kilroyle
Elena Kirios
Kay Kirios
Pat Lee
Wayne Lozzi, Lynn City Council
Dustin Luca, The Salem News
Jill Madigan
Mary Malone
Bill Marnik, Friends of Spring Pond
Matt McCormack
Melina
Jean Mulhern
Mary Ann Munar, AACT-RTAC
Estelle Revelotis
Bill Rogers, City of Lynn
Kathy Sands
David Wescott, Instant Alarm
K Wirth
Travis Wojcik

Attendance (September 13)

Alexandra
Jim Anderson
Cyndy Anselno
Gary Barrett
Gene Beuderman
Jan and Jim Bettger
Patrick Bennet
Susan Bennett
Lorraine Black
Mary Jane Blais
Phillip Blaskovich
Joanne Brasil
Mark Burns
Bill Buttner
Doris Buttner
Laura Christiansen
Rebecca Christie
Dennis Colbert
Don Collins
Scott Conley
Lucille Cuicillo
Josephine D'Amato
Panfilo D'Amato
Beth Debski, The Salem Partnership
Jim DeFilippi
Ann DeIulis
Patrick DeIulis, Salem Chamber of Commerce
Neil Denenhas
June DeRoin
Chuck Dolce
Michael Donahue
Leanne Duncan
David Eppley, City of Salem
Richard Falanga
Linda Ferraresso
Ken Fine
L. de la Flor
Bradford Freeman
Nancy Gilberg
Joan Gilman
K.J. Girord
Gus
Jim Hacker
Ricki Hacker
Jean M. Hart
Gary Hebert
David Jacobson
Steve Jackson

Dave Janes
Jim Jellison
Ken Jones
Vinod Kalikiri
Joanna Kavalans
David Knowlton, City of Salem
Bonnie Kobialka
Paul LeBlanc
William Legault
Pat and Tony Liberti
Sen. Joan Lovely, MA Senate
Stephen Lovely, Salem City Council
Dustin Luca, Salem News
Jill Madigan
Toni Macione
Angela Mansi
Tom McAuliffe
James Melansan
Marilyn Smith Melansan
Carol and Fred Miller
Elaine Milo, Salem City Council
Mike Murray, Salem Access TV
Joseph O'Neil, Salem Bicycle Council
Rinus Oosthoek, Salem Chamber of Commerce
Paul and Karen Pagnotti
Eric Papetti
David Pelletier
David Powell
Dan and Gayle Puopolo
Tobin Reckuhi
Robert Ross
Frank Ryan
Yvonne Santiago
Jeanne Scott
Richard Scott
Elaine Skolnick
Karen Stelle
Arsie Sullivan
Nina Talalayevsky
Hedy Thibault
Cliff and Anne Thomson
Kathleen Tone
Theresa Tone
Ann Tucker
Rep. Paul Tucker, MA House of Representatives
Patricia Tusci
Christopher Walkers
David Walsh
Debbie Smith Walsh
John Coleman Walsh
Marilyn Whalen
Michael Williamson
Jamie Yomtov
[2 illegible names]



Route 107 Corridor Study:

Data Collection, Analysis and Conceptual Design of Alternatives Along Route 107 in Salem and Lynn, MA

Appendix D **Public Comments on Draft Report**

Comment #1

Email sent to Michael Clark on October 4, 2016

Dear Michael,

Kudos to you! I've done a cursory reading of the final report, which has answered many of my preliminary questions and concerns.

Well done - and thank you for all you do!

Leanne Duncan

Email response from Michael Clark

Thank you Ms. Duncan.

Comment #2

Email sent to Michael Clark on October 4, 2016

I may not have time to read tonight but a neighbor is reading it and says it appears the re-routing of the "zig zag" thru Traders Way and First Street now looks like it might happen. We thought our politicians said it WOULD NOT happen. Do you have time to comment on that?

Nancy Gilberg

Email response from Michael Clark

Hi Ms. Gilberg,

This is a draft Final Report and our analysis is reflective the work completed through the public meeting. It's customary for the agency to wait until after the public comment period of the draft report before deciding to amend any recommendations based on feedback.

As this study is looking at concepts for the corridor the City would need to be supportive of any specific idea in order for it to be advanced for further design, so no proposal presented in the report should be interpreted as absolutely happening.

Thanks,
Michael

Comment #3

Email sent to Michael Clark on October 5, 2016

As a 20 year resident of the portion of the study area between Fays Avenue Lynn and the Salem line, I read carefully the proposal for this part of 107. I was pleased to see that the no on street parking in this section is continued. This is vital to the residents being able to get in and out of their driveways safely. I worked hard personally to get the "State Highway No Parking" signs installed along this portion of the road. Parked cars impede a drivers view of oncoming traffic when backing out of the driveway especially on the odd side of the street which is the downhill side. Traffic traveling down from Salem is going an a speed above the speed limit most times and is a threat to residents safety. Because of the traffic, cars would and still are, often parked on the sidewalks for the protection of the cars against the posted signage. This endangers pedestrians walking along the sidewalks often forcing them out into the road. It is imperative that parking remain banned along this section and that enforcement is improved. Also, what is the enforcement against driving in a bicycle lane? We have a problem with cars speeding down the breakdown lane from Salem to Fays Avenue to avoid the back up at the Fays Avenue light. Sometimes these cars turn right on to Fays Avenue but frequently cut back into the line of traffic at Fays Ave. This is also a hazard to residents trying to enter or exit their driveways. If a bicycle lane helps to prevent this, I can live with that. However, if the bicycle lane is buffered, I would urge you to make sure that there is sufficient access to each driveway through the buffered lane. Also, during the winter, the State is responsible for plowing this section of 107 and into Salem. If there is heavy snow, they plow curb to curb throwing the plowed snow onto the shoveled sidewalks. This snow is almost impossible to remove in a timely manner by the residents as it is compressed chunks of ice and sand from the roadway. New policies on plowing by the State must be developed to maintain safety for all, vehicles, pedestrians, bicyclists as well as residents responsible for removing snow from in front of their property. I would suggest that the State limit its plowing to the width of the vehicle travel lanes, avoiding the bicycle lane, in order to keep from dumping more snow onto sidewalks. Bicycles would probably not be traveling during the winter in heavy snow anyway and this would leave a buffer from plowing for the residents clearing their walks for pedestrians. I would think that buffering the bicycle lane in some ways would also provide a natural buffer from plowing onto the sidewalks. Also, some provision will have to be made for clearing the sidewalks that will be installed further along in the retail portion of the roadway.

Please consider my comments when developing your final plan. Residents of this stretch of 107 are already putting up with many inconveniences, some natural and some man made and getting enforcement for posted signage is difficult at times. Many of us are senior residents and have been here for many years. It would be a shame to be forced to sell our homes and move because the State made traffic and plowing conditions even worse than they are now.

Jeanne McAuley
Lynn, MA

Email response from Michael Clark

Hi Ms. McAuley,
Thank you for your comments. Enforcement of vehicular misbehavior, whether driving in the breakdown lane or in a future bike lane, would continue to be the responsibility of each community.

Thanks,
Michael

Follow-up email to Michael Clark on October 7, 2016

Thank you for your response. I can see that enforcement will still be an issue. One other thought, will cars be able to move into the bicycle lane to allow ambulances to pass. There will be increased ambulance traffic (we are already seeing it) with the consolidation of inpatient services at Salem Hospital in the next 3 years. Now, the cars are able to move over to let the ambulances pass, but, depending on the type of buffering, cars will need to be able to move over in the future. I hope the buffering style chosen will not be obtrusive such as the standing posts. This will make a bad visual impact to the residences in this area potentially affecting the curb appeal and lowering property values.

Jeanne McAuley

Email response from Michael Clark

Hi Ms. McAuley, thank you for your input. The specifics of the bicycle lane design, including apportionment of lane space and types of buffering, would be explored more in depth and finalized during the design phase of a project.

Thanks,
Michael

Comment #4

Email sent to Michael Clark on October 5, 2016

Hi Michael - I didn't see any cost estimates for the recommendations. Did I miss them?

--
Thomas Grillo
The Daily Item

Email response from Michael Clark

Hi Thomas,

They are at the end of Chapter 6-D, or p. 198 of the overall study.

Slide 27 of part 4 of the 9/13 presentation also details costs, in a little more detail than in the report. These costs are approximate and would become more defined as components of the study are advanced through the design stage.

Thanks,
Michael

Comment #5

Email sent to Michael Clark on October 5, 2016

Mr. Clark,

I hope you are well. Attached you will find a joint response to the Route 107 Project written by MassBike, Livable Streets and WalkBoston. We trust you will give this matter due consideration.

I have also mailed a hard copy to many of those copied on this note.

We would welcome a chance to discuss this with you. We feel this is a once-in-a-50-year opportunity to create a safe corridor where all residents, regardless of their mode of transportation, are provided safe passage.

Regards,

Richard Fries
Executive Director
MassBike

Email response from Michael Clark

Hi Mr. Fries,

Thank you for the thoughts and comments expressed in the letter from MassBike, the LivableStreets Alliance, and WalkBoston regarding multimodal improvements detailed in the Route 107 Corridor Study draft Final Report. McMahon Associates reviewed your comments and have prepared a response below. The roadway concepts developed as part of this study aim to encompass the study's goals, objectives, and evaluation criteria while illustrating the direction provided by the Working Group. Opportunities to address design components of the corridor above and beyond the scope of this planning study, or to adjust any improvement concepts recommended in the report, will be provided in the design process of a future project.

Thanks,
Michael

Comment 1: **Redesign the corridor with an awareness of Bicycle Level of Traffic Stress.**

Thank you for introducing the much-needed concept of Level of Traffic Stress (LTS) to the general public. We believe that in addition to LTS, every project should contain explicit reference to "design users and conditions," and that those users should include children, the elderly, and people with disabilities who use bicycles as a mobility aide, and that those users should be able to safely navigate the system at all times of day and in all weather conditions. Every portion of the project should be explained in terms of how it meets the needs of these users, and project teams should design a facility which meets their needs before addressing automotive LOS. If additional funds are needed to maintain automotive LOS after meeting the needs of the area's most vulnerable design users, then that extra cost should be attributed to the automotive portion of the

project, not the portion of the project which supports the vulnerable (bike lanes, sidewalks, etc.).

Response: **Noted.**

Comment 2: **Reduce lane widths from 11 feet to 10 feet**

MassDOT is proposing 11-foot travel lanes throughout the corridor in order to accommodate truck traffic. However, 10-foot lanes are used successfully on roadways throughout the Commonwealth which have high volumes of truck traffic. One example is Binney Street in Cambridge, which has 10-foot lanes next to a bike lane. Binney Street is the hazmat detour for the Central Artery. Indeed, if that route can have 10-foot lanes without incident, so can 107. Ten-foot lanes will reduce vehicle speeds while allowing wider sidewalks, bike lanes, or buffers. The combination of slower vehicle speeds and more space for pedestrians and cyclists will improve safety for all road users.

Response: **For the planning concept of Route 107, eleven foot lanes were selected given the prevailing characteristics of the roadway, while still recognizing the opportunity to reduce current lane widths from twelve feet. Given Route 107's status as an urban major arterial and the presence of truck traffic along the roadway it was determined that eleven foot lanes were most appropriate for the corridor at this time. MassDOT's Project Development and Design Guide, particularly Chapter 5.3.3.3, recommends travel lanes between eleven and twelve feet in width for roadways with higher design speeds (45 miles per hour or more), higher traffic volumes (2,000 or more vehicles per day), or higher truck and bus activity (greater than 30 per hour). The last two conditions are met along this corridor. When the project moves into design, ten foot lanes can be considered within the corridor where appropriate. A Design Exception Report would be required to allow for ten foot lanes on a state highway, which is traditionally taken on in the design phase.**

Comment 3: **Eliminate landscaped medians throughout the corridor.**

Medians, like wide travel lanes, encourage speeding and reduce the space at the edge of the roadway that can be used to make safety improvements for people who walk and bike, such as wider sidewalks and separated bike lanes. Medians also reduce "friction" from oncoming traffic, which while at first glance seems to be a benefit to safety since it limits left turns, in reality often reduces safety because it makes drivers feel that they can drive much faster than they should. When plantings or trees are provided along a street, as they often should be, they are much more useful at the sides of the street rather than in the middle. Not only are trees more likely to survive and thrive there, they are much better incorporated into sidewalks or bike lane buffers. Space in the middle of the street is essentially "dead", but space on the sides can be used by people.

Response: **During the public outreach process, roadway cross-sections with and without medians were considered by the Working Group. The Working Group formed a consensus in favor of maintaining medians along the corridor where they currently exist. Planted medians were proposed instead of the guardrail divided medians that exist today in an effort to improve the aesthetics and to change the look and feel of the corridor from a "freeway" type design to a "boulevard" type design. The proposed medians are at least eight feet wide which can accommodate tree growth.**

Comment 4: **Build bike lanes with physical barriers and protected intersections to protect cyclists from traffic.**

Striped bicycle lanes and sharrows are helpful for legitimizing the presence of cyclists on the roadway and for alerting motorists to their presence, but painted lines on the roadway only have a modest impact on increasing safety and increasing bicycle ridership. In urban areas, vehicles illegally park in bike lanes, forcing cyclists to swerve into traffic. Paint-only bike lanes often also place cyclists in the door zone of parked cars. Sharrows encourage cyclists to ride in the center of the lane, but their presence is often not welcomed or effective on busy roadways where vehicle speeds are significantly higher than biking speeds. We therefore urge MassDOT to:

- Convert the proposed standard striped bike lanes into physically separated bike lanes, with a physical barrier and/or parking lane between the bike lane and travel lanes.
- Design the intersections using the protected intersection design guidance in the MassDOT Separated Bike Lane Design Guide. In particular, this type of design would allow for safer left turns by bicyclists and would reduce the right hook risk from vehicles turning right across the path of bicyclists.
- Avoid the use of sharrows on any roadway in this project scope where the posted speed limit is above 25 mph.

Response: **The locations with buffered bike lanes are intended to have physical protection. The report text was not clear on this matter. The physical protection is shown in the roadway cross-sections but was not explained in the text of the report. The Final Report will be revised accordingly. Sharrows are only proposed for a short distance at Willson Street southbound where there is an option to provide bicycle facilities off-street within the school property, potentially freeing up space for a dedicated bicycle lane. Only the Lynn section of the corridor has parking adjacent to bike lanes. Multiple cross-sections for the Lynn corridor were presented to the Working Group, including options that provide buffers. The Working Group expressed concerns about wholesale elimination of parking in this portion of the corridor and opted to maintain parking on both sides of the roadway. At the intersections, bicycle boxes and two-stage queue boxes are proposed to help cyclists compete turning maneuvers.**

Defining the physical separation, and adding protected intersections or additional widths to bike facilities during design can be considered in conjunction with right-of-way constraints, truck turning radii, maintenance, and funding.

Comment 5: **Commit to not reducing sidewalk widths in any part of the project**

In the Northern Corridor segment, the proposed design reduces the sidewalks from 9' (5' with a 4' planting strip) to 7' with no planting strip. This planting strip acts as a buffer between pedestrians and traffic and also provides a place for plantings and trees outside of the walking path of pedestrians. Losing this buffer would degrade the pedestrian experience.

Response: **The pedestrian space in the northern section of the corridor was reduced in order to include bicycle facilities in the segment. The bicycle lane will provide some buffer from the roadway. Lane widths can be reconsidered during the design phase, and if reduced, then the additional space may be available for sidewalk buffers, wider sidewalks, or increased widths on the bike facilities.**

Comment 6: **Include bike lanes on the portions of intersecting streets within the project scope.**

The goals for the intersecting streets should be to provide proper accommodation for bicyclists, minimize the length of the crosswalks and to encourage drivers to drive safely and slowly. Sharrows may be an acceptable solution where the posted speed limit and design speed are at or below 25 mph, but are not appropriate for any portion of Route 107 itself.

Response: **The roadway concepts along Route 107 do not preclude the addition of bicycle facilities on side streets along the corridor. However, it is beyond the scope of project to examine bicycle facilities on these side streets.**

Comment 7: **Provide safe and convenient signal timing for pedestrians and bicyclists.**
Where walk signals are concurrent to a green traffic phase, there should be a 5-second leading pedestrian interval, and the walk signals should come on without requiring pedestrians to press a button. Where there is an exclusive pedestrian phase, No Turn on Red should be posted at all approaches. The addition of bicycle signal phases (with separate bicycle signal heads) should be considered where special movements are needed for bicycles, where significant car/bike conflicts are expected to occur, or where it may be desirable to include a leading bicycle interval.

Response: **Signal timings for pedestrians and bicyclists are an important component to a multi-modal corridor and would be developed during the design phase of the project.**

Comment 8: **Identify opportunities for transit signal priority and queue-jump lanes in the corridor.**
Consider connections to a future south Salem commuter rail stop when siting bus stops and analyzing bus-related improvements. Providing fast, frequent, and reliable bus service will be a key component of making this a livable corridor.

Response: **Proposed improvements to the corridor for transit include bus stop consolidations, sidewalk and bicycle improvements, and intersection operations improvements. Based on current bus frequency, dedicating space at intersections for queue jumps at the expense of bicycle, pedestrian, and vehicle space, at this time, does not appear to be desirable. Signal priority measures and commuter rail connections are decisions to be made in conjunction with the MBTA. Coordination with the MBTA will continue during the design of the project to ensure a corridor design that can accommodate the provided transit.**

Comment 9: **Clarify further the design of the shared street at Boston Street.**
A shared street is typically one where there are no curbs, no lanes, and no signals. The surface of the street is consistent from edge to edge, usually pavers or some other textured material. People on foot, on bikes and in motor vehicles all share the street and negotiate with each other, traveling slowly and safely. Bollards are sometimes provided to prevent cars from driving into buildings. At intersections, a roundabout can be provided (but does not have to be.) However, such features are not shown in the presentation. What appears to be shown is simply bike lanes that end in some sort of pavers, along with a standard roadway intersection design. We find this design to be confusing and hope that MassDOT will clarify it further, ideally into something similar to what we have just described.

Response: **The concept developed in this study shares some characteristics with what is described above and differs in other areas. The "shared" portion of the roadway would only occur within the noted paver sections adjacent to the building edges to provide space for pedestrian, bicyclists, and motorists to access**

buildings and complete turning movements. Cross Street in the North End of Boston provides a conceptual example and is shown in Figure 1.

The primary idea behind the "shared street" concept is create new open space and a plaza-style environment created by realignment of the intersection. Due to the driveways at the intersection a "shared street" would allow for continued access to businesses at this intersection. Entry and egress through the driveways by motorists would need to be made obvious by markings in the pavement of the road or within the different material or texture of the new space itself, signage, and orientation of the space itself. For instance, cut-through movements by motorists traveling northbound along Highland Street to avoid the traffic signal would need to be made unviable, which can be achieved through visual cues and fixed objects in the shared space. The orientation of the space itself would be determined in the design phase.

A roundabout was explored at this space and found to not be feasible because there would be right-of-way impacts and the close proximity of the fire station would present safety and operational challenges.

Michael Clark
Route 107 Corridor Study Project Manager
MassDOT Office of Planning
10 Park Plaza, Suite 4160
Boston, MA 02116

Dear Mr. Clark, et al,

Thank you for considering people who walk and bicycle in MassDOT's proposed redesign of the Route 107 corridor between Salem and Lynn. The redesign will be a dramatic improvement over current conditions, providing additional safety for existing users while encouraging additional walking and biking trips in the corridor.

The bike, pedestrian, and transit components of this corridor are a part of the long-term solution to transform 107 into an appealing boulevard which will support developments and redevelopments which do not solely depend on car traffic for success. For decades, this road has suffered from auto-oriented highway planning which created conditions where only auto-oriented retail and residential developments could thrive. Automobile dependency, in turn, created the demand for wider roads and squeezed out almost all street life. With this redesign, MassDOT has the opportunity to balance transit, walking, and biking with automobiles, thereby making the Route 107 corridor more connected and more livable for everyone, and changing the context in which future redevelopments will occur.

We applaud MassDOT for providing continuous, often generous, sidewalks along with convenient crossings at all four legs of each intersection for pedestrians, along with continuous bike lanes, with additional striped buffers from traffic in locations where automobile speeds are expected to be higher. This design, if built today, would certainly be an improvement over what Route 107 currently has.

While the MassDOT plan is an important step forward, we believe that a "bolder" design which reduces pedestrian and bicyclist stress even further will have more universal appeal and broader public support as this project continues to develop. To that end, we have outlined a number of recommendations for improving upon the proposed design.

General recommendations:

1) Redesign the corridor with an awareness of Bicycle Level of Traffic Stress.
Thank you for introducing the much-needed concept of Level of Traffic Stress (LTS) to the general public. We believe that in addition to LTS, every project should contain explicit reference to "design users and conditions," and that those users should include children, the elderly, and people with disabilities who use bicycles as a mobility aide, and that those users should be able to safely navigate the system at all times of day and in all weather conditions. Every portion of the project should be explained in terms of how it meets the needs of these users, and project teams should design a facility which meets their needs before addressing automotive LOS. If additional funds are needed to maintain automotive LOS after meeting the needs of the area's most vulnerable design users, then that extra cost should be attributed to the automotive portion of the project, not the portion of the project which supports the vulnerable (bike lanes, sidewalks, etc.).

2) Reduce lane widths from 11 feet to 10 feet
MassDOT is proposing 11-foot travel lanes throughout the corridor in order to accommodate truck traffic. However, 10-foot lanes are used successfully on roadways throughout the Commonwealth which have high volumes of truck traffic. One example is Binney Street in Cambridge, which has 10-foot lanes next to a bike lane. Binney Street is the hazmat detour for the Central Artery. Indeed, if that route can have 10-foot lanes without incident, so can 107. Ten-foot lanes will reduce vehicle speeds while allowing wider sidewalks, bike lanes, or buffers. The combination of slower vehicle speeds and more space for pedestrians and cyclists will improve safety for all road users.

3) Eliminate landscaped medians throughout the corridor.
Medians, like wide travel lanes, encourage speeding and reduce the space at the edge of the roadway that can be used to make safety improvements for people who walk and bike, such as wider sidewalks and separated bike lanes. Medians also reduce "friction" from oncoming traffic, which while at first glance seems to be a benefit to safety since it limits left turns, in reality often reduces safety because it makes drivers feel that they can drive much faster than they should. When plantings or trees are provided along a street, as they often should be, they are much more useful at the sides of the street rather than in the middle. Not only are trees more likely to survive and thrive there, they are much better incorporated into sidewalks or bike lane buffers. Space in the middle of the street is essentially "dead", but space on the sides can be used by people.

4) Build bike lanes with physical barriers and protected intersections to protect cyclists from traffic.
Striped bicycle lanes and sharrows are helpful for legitimizing the presence of cyclists on the roadway and for alerting motorists to their presence, but painted lines on the roadway only have a modest impact on increasing safety and increasing bicycle ridership. In urban areas, vehicles illegally park in bike lanes, forcing cyclists to swerve into traffic. Paint-only bike lanes often also place cyclists in the door zone of parked cars. Sharrows encourage cyclists to ride in the center of the lane, but their presence is often not

welcomed or effective on busy roadways where vehicle speeds are significantly higher than biking speeds. We therefore urge MassDOT to:

- Convert the proposed standard striped bike lanes into physically separated bike lanes, with a physical barrier and/or parking lane between the bike lane and travel lanes.
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- Avoid the use of sharrows on any roadway in this project scope where the posted speed limit is above 25 mph.

5) Commit to not reducing sidewalk widths in any part of the project

In the Northern Corridor segment, the proposed design reduces the sidewalks from 9' (5' with a 4' planting strip) to 7' with no planting strip. This planting strip acts as a buffer between pedestrians and traffic and also provides a place for plantings and trees outside of the walking path of pedestrians. Losing this buffer would degrade the pedestrian experience.

6) Include bike lanes on the portions of intersecting streets within the project scope.

The goals for the intersecting streets should be to provide proper accommodation for bicyclists, minimize the length of the crosswalks and to encourage drivers to drive safely and slowly. Sharrows may be an acceptable solution where the posted speed limit and design speed are at or below 25 mph, but are not appropriate for any portion of Route 107 itself.

7) Provide safe and convenient signal timing for pedestrians and bicyclists.

Where walk signals are concurrent to a green traffic phase, there should be a 5-second leading pedestrian interval, and the walk signals should come on without requiring pedestrians to press a button. Where there is an exclusive pedestrian phase, No Turn on Red should be posted at all approaches. The addition of bicycle signal phases (with separate bicycle signal heads) should be considered where special movements are needed for bicycles, where significant car/bike conflicts are expected to occur, or where it may be desirable to include a leading bicycle interval.

8) Identify opportunities for transit signal priority and queue-jump lanes in the corridor. Consider connections to a future south Salem commuter rail stop when siting bus stops and analyzing bus-related improvements.

Providing fast, frequent, and reliable bus service will be a key component of making this a livable corridor.

9) Clarify further the design of the shared street at Boston Street.

A shared street is typically one where there are no curbs, no lanes, and no signals. The surface of the street is consistent from edge to edge, usually pavers or some other textured material. People on foot, on bikes and in motor vehicles all share the street and negotiate with each other, traveling slowly and safely. Bollards

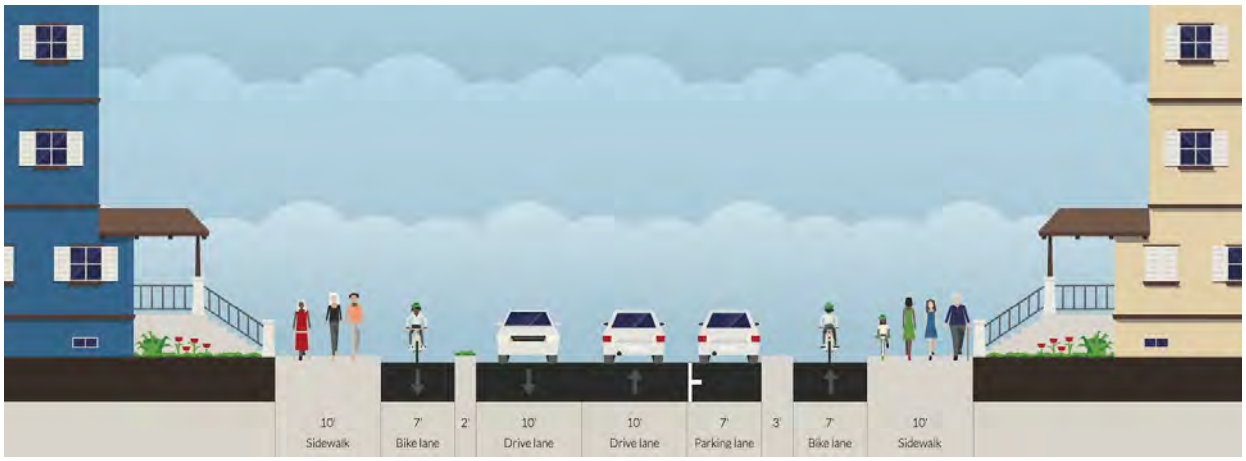
are sometimes provided to prevent cars from driving into buildings. At intersections, a roundabout can be provided (but does not have to be.) However, such features are not shown in the presentation. What appears to be shown is simply bike lanes that end in some sort of pavers, along with a standard roadway intersection design. We find this design to be confusing and hope that MassDOT will clarify it further, ideally into something similar to what we have just described.

Possible Cross-Sections:

We have come up with our own proposed cross-sections for the 3 segments of the project that incorporate the general principles we have outlined above. For all of these, intersections would look different, of course, but we are confident that there is room for left turn lanes and physically separated bike lanes.

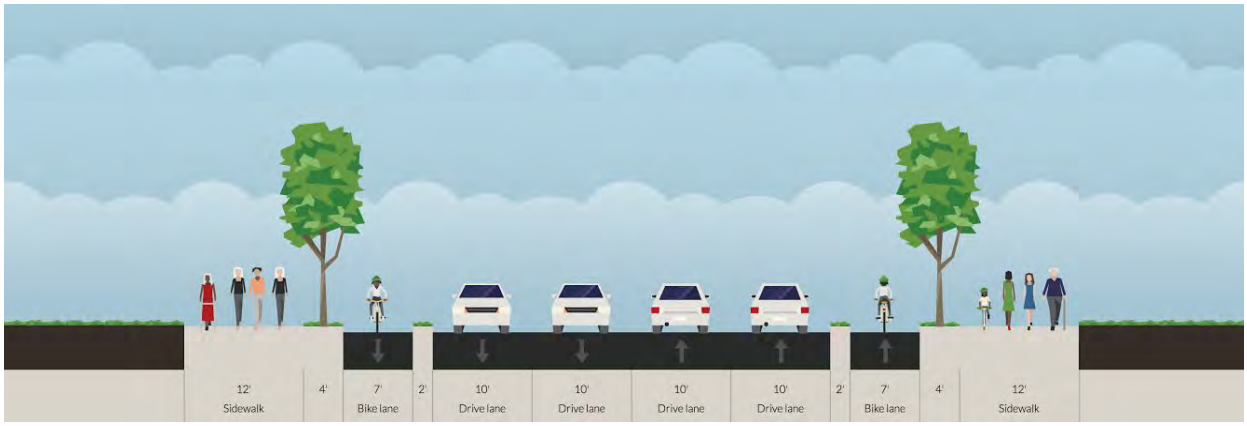
Lynn Corridor Segment

We have removed on-street parking from the north side of the street in order to make room for the physically separated bike lanes.



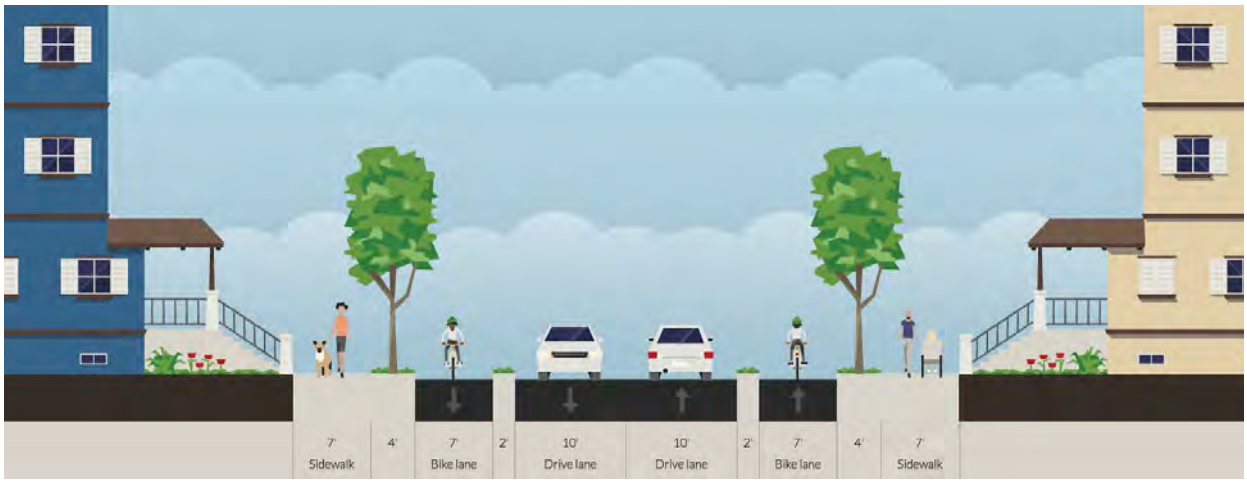
Retail Corridor Segment

We removed the median and we were able to widen the sidewalks, add wide planting strips with trees between the sidewalks and physically separated bike lanes on both sides of the street.



Northern Corridor Segment

We removed the center dual left turn lane, in order to provide physically separated bike lanes, wider sidewalks, and trees.



Thank you again for the public outreach and collaborative process you have created for this project. We look forward to working with MassDOT and local leaders to provide input as this project develops further. Please feel free to contact us at any time for further clarification on our feedback and suggestions.

Sincerely,

Richard Fries
Executive Director, MassBike

Charlie Denison
Advocacy Committee Chair, LivableStreets Alliance

Wendy Landman
Executive Director, WalkBoston

CC: Route 107 Working Group

Comment #6

Email sent to Michael Clark on October 5, 2016

This email is regarding feedback on the Rt 107 Study.

1. The Zig Zag. The resolution presented in this document shifts the traffic from Marlboro-Highland-Swampscott to Marlboro-Traders-First-Swampscott. This shift places an undue stress on a neighborhood. Another solution to utilize the existing traffic light at Marlboro and McGrath Park. Setting this light to cue traffic into groupings that will not exceed the left turn from Highland to Swampscott. Coordinating these lights will better allow for traffic flow on Highland. I have witnessed this cuing when McGrath light triggers more frequently when the park is in use; the amount of cars through to Highland Ave are fewer in increment and does not congest Highland Ave.

2. Consider maintaining the 4 lanes (two in each direction) from Valley St. north to Essex St. The plan calls for one lane in each direction and a center turn lane. With 4 lanes now, traffic backs up in this area, a 50% lane reduction lane in each direction will impact traffic and not be able to accommodate the current vehicle usage.

Artie Sullivan
Schooner Group, Inc.

Email response from Michael Clark

Hi Mr. Sullivan,

Thank you for your comments.

-Michael

Comment #7

Email sent to Michael Clark on October 6, 2016

Hello Mr. Clark,

Great job with the Salem RT 107 report. You have presented a logical and workable solution.
I have lived in Salem for almost 66 years and have had many related experiences, this small city is the world's worst when it comes to NIMBY.

Examples from just the last few years, Senior center on Bridge Street still not built, F.W. Webb use and remediation of a hazardous site rejected by the neighbors 2 times, Salem Station Power plant replacement dragged through the courts over and over.

The list is endless, they would rather sit in traffic forever than open their minds to other choices.
The only resolution these Luddites will accept is the removal of the bridge from Lynn as a traffic solution.

I am sure you were aware going into this that nothing you proposed would ever be accepted.

But thanks for trying.

Regards,
Mark Carr

Email response from Michael Clark

Hi Mr. Carr,

Thank you for your comments.

-Michael

Comment #8

Letter sent to Michael Clark dated on October 6, 2016

See next page for letter from Martin Perkins.

REF. ROUTE 107 TRAFFIC PROBLEM IN SALEM, NEWS ON OCT. 6, 2016

MR. CLARK

BEING A SALEM RESIDENT, I'VE DRIVEN HIGHLAND AVE. TO AND FROM SALEM FOR OVER 60 YEARS AND I AM FAMILIAR WITH THE LANE HOPPING AND CONGESTION THAT OCCURS IN BOTH DIRECTIONS AT THE INTERSECTIONS OF BOTH SWAMPSCOTT RD AND MARLBOROUGH RD AT HIGHLAND AVE.

TO ELIMINATE (OR REDUCE) THIS SITUATION, I AM RECOMMENDING THE FOLLOWING:

1. ALLOW NO RIGHT TURN AT JUNCTION OF SWAMPSCOTT RD AND HIGHLAND AVE, FOR SWAMPSCOTT TRAFFIC.
2. ADD "TO PEABODY AND SALEM" ARROW SIGN AT JUNCTION OF FIRST ST. AND SWAMPSCOTT RD.
3. ADD "TO PEABODY AND SALEM" ARROW SIGN AT INTERSECTION OF TRADERS WAY AND FIRST ST. ALSO ARROW SIGN TO "DOWNTOWN SALEM" STRAIGHT DOWN FIRST ST.
4. ADD "NO LEFT TURN" SIGN ON HIGHLAND AVE AT JUNCTION WITH SWAMPSCOTT RD.
5. ADD ARROW SIGN FOR "SWAMPSCOTT AND MARBLEHEAD" AT MARLBOROUGH RD, AND HIGHLAND AVE INTERSECTION WITH STRAIGHT ACROSS HIGHLAND AVE. ARROW
6. ADD LEFT TURN SIGN ON HIGHLAND AVE. AT TRADERS WAY AND MARLBOROUGH INTERSECTION FOR "SWAMPSCOTT AND MARBLEHEAD" FOR TRAFFIC COMING FROM SALEM.
7. ADD RIGHT TURN ARROW SIGN AT INTERSECTION OF TRADERS WAY AND FIRST ST. FOR SWAMPSCOTT AND MARBLE HEAD TRAFFIC

8. ARROW SIGN TO SWAMPSCOTT AND MARBLEHEAD AT INTERSECTION OF FIRST STREET AND SWAMPSCOTT ROAD.

THESE CHANGES IN TRAFFIC FLOW WOULD REDUCE ALL LANE HOPPING AND CONGESTION THAT EXISTS IN THIS AREA NOW.

AS FOR ZIG-ZAGS, THE ONLY TRAFFIC TO ZIG-ZAG WOULD BE SALEM TO SWAMPSCOTT-MARBLEHEAD VIA SWAMPSCOTT ROAD.

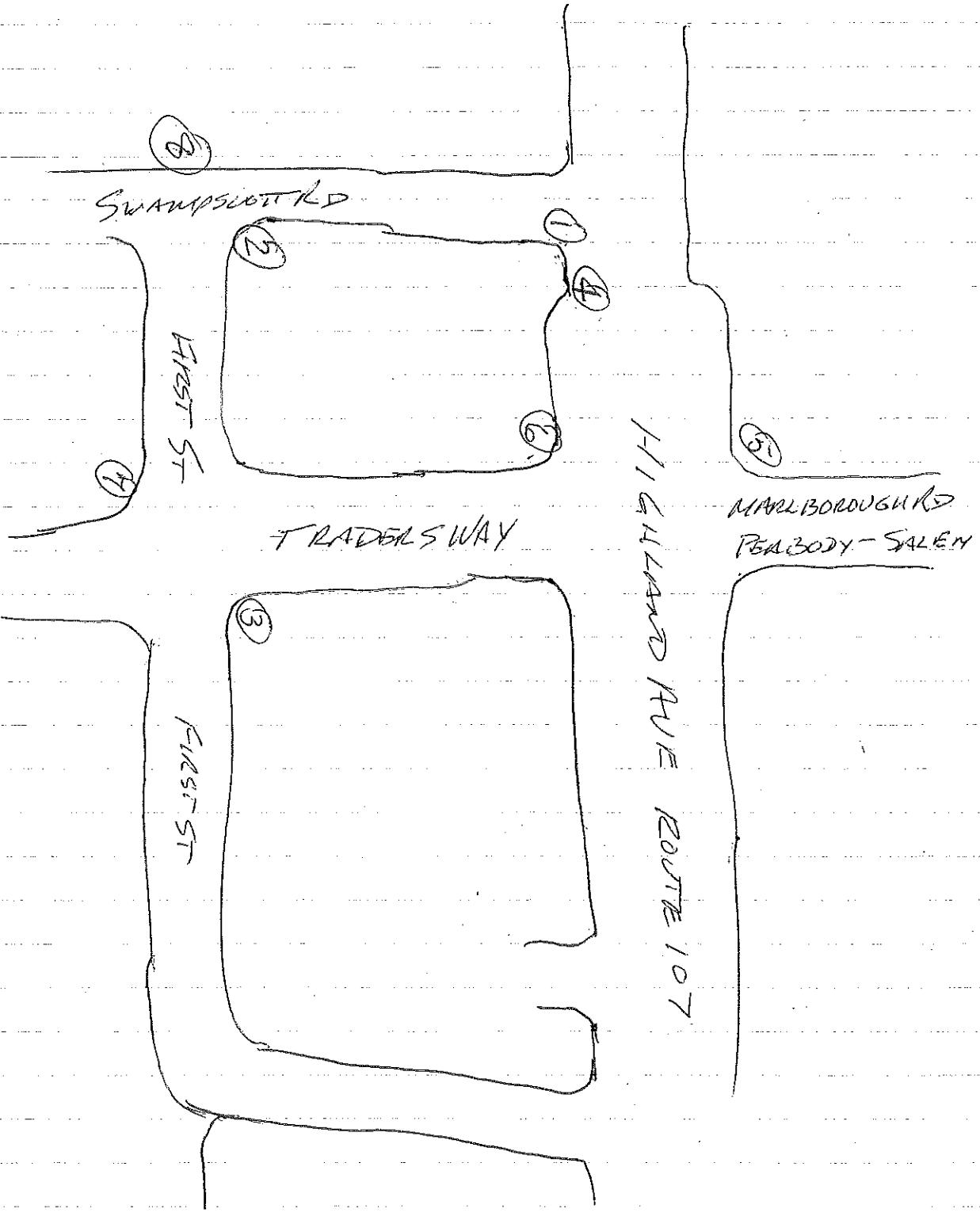
AMOUNT OF TURNS —	CURRENT	NEW
PEABODY TO SWAMPSCOTT	2	2
SWAMPSCOTT TO PEABODY	2	2
LYNN TO PEABODY	1	1
LYNN TO SWAMPSCOTT	1	1
SALEM TO SWAMPSCOTT	1	3

SINCE THE SALEM TO SWAMPSCOTT TRAFFIC ON HIGHLAND AVENUE IS MINIMAL, I THINK THE OVERALL CHANGE WOULD BE BENEFICIAL. MINOR CHANGES TO EXISTING TRAFFIC LIGHTS AND CYCLE TIMES TO EXPEDITE TRAFFIC FLOW MIGHT HELP.

ALL THIS COULD BE DONE ON A TEMPORARY BASIS WITH MINIMAL COST OF SIGNS ONLY AND PROPER ANNOUNCEMENTS IN SALEM NEWS.

Martin P. Perkins
MEADOW ST
SALEM, MA 01970

cc:
MAYOR DRISCOLL
TRAFFIC CONTROL - SALEM POLICE.


SWAMPSCOTT RD
FIRST ST
TRADERS WAY
HIGHLAND AVE ROUTE 107
MARLBOROUGH RD
PEABODY - SALEM
FIRST ST
1
2
3
4
5
6
7
8

Comment #9

Email sent to Michael Clark on October 6, 2016

My Initial comment, based on what I saw in the newspaper, is about the zig-zag suggestion. I'm not sure how much that would help. One of the biggest problems I see is the same intersection but it involves vehicles making a left turn in to Marlborough road heading to Peabody. Consistently, in the 7 to 9 am time frame, vehicles are backed-up to Swampscott Road, causing vehicles heading to Salem to be forced to one lane due to the back-up. The same situation may exist in the evening, but I don't know. I'm not in the area.

I look forward to looking over the complete report. Again thank you for sending it to me.

William Reilly
Lynn, MA

Email response from Michael Clark

Hi Mr. Reilly,

Thank you for your comment. Please let us know if you have anything to add upon reviewing the report.

Thanks,
Michael

Comment #10

Email sent to Michael Clark on October 6, 2016

Has anyone considered using a round-about in the plans. They work great to slow traffic but keep it moving. The zig-zag is absurd, many people already use these streets to cut over 107. Adding more congestion to them is not the answer.

Arthur Marengi

Email response from Michael Clark

Hi Mr. Marengi,

Roundabouts were considered at the intersections of Route 107 at Swampscott Road, Marlborough Road, and Boston Street. In each case, the layout of the roundabout required right-of-way acquisition, resulting in consequential impacts. In the case of Route 107/Marlborough Road, poor levels of service were projected for the two lane roundabout, in addition to the right of way impacts.

Consideration of roundabouts was included in meeting presentations and documented in the project report.

Thanks,
Michael

Comment #11

Letter mailed to Michael Clark dated on October 7, 2016

See letter from Salem City Councilor Stephen Lovely on next page.

City of Salem, Massachusetts

Office of the City Council
City Hall

Office of Transportation Planning
Attn: Michael Clark / Route 107 Corridor Study
Massachusetts Department of Transportation
10 Park Plaza, Suite #4150
Boston, MA 02116

October 7, 2016

Dear Mr. Clark,

As the Ward 3 city Councillor and member of the Route 107 Working Group, I write to express my opposition to specific traffic mitigation plans outlined in the Route 107 Corridor Study Report published on October 5, 2016.

The goals of the Route 107 Corridor Study seek to improve mobility, connectivity, and safety for all transportation modes and users along the corridor, support local economic development, and improve the quality of life for residents and businesses in the corridor. The proposed plans to redirect and shift traffic from Marlborough Road and Swampscott Road onto Traders Way and First Street, the so-called "Zig-Zag" do not meet the goals of the Corridor Study, and are not practical to the residents and businesses located in that area of Salem. Traders Way and First Street would be unable to accommodate the additional traffic congestion, and frankly this change would instead relocate the congestion from one location to another.

During the public review process, many residents of the Salem cited extremely strong opposition to the suggested study alternatives for the intersection of Marlborough Road and Swampscott Road. I oppose these proposed recommendations as they will negatively impact the quality of life for many residents and businesses along Traders Way and First Street. I respectfully request that further research be done to amend this proposal and I look forward to working with you towards that goal.

Sincerely,

City Councillor Stephen P lovely

Comment #12

Email sent to Michael Clark on October 9, 2016

One thing to fix would be to paint the island with the traffic light post.
The curb and top surface should all be painted with a white reflective material which is easy to see.
Turning onto Swampscott rd from 107, we have to pause to be sure not to hit the curb.
Take a drive and think about it.

Steven Petersen

Email response from Michael Clark

Hi Mr. Petersen,

Thank you for your comments. This would likely be an item that could be considered in the design phase of a project.

-Michael

Follow-up email to Michael Clark on October 11, 2016

What about a light at golds gym intersection? Worth it?

Email response from Michael Clark

Hi Mr. Petersen,

A new traffic signal is suggested at the intersection of Swampscott Road and First Avenue to accommodate a left turn lane from First Street and both an approach lane and receiving lane on the Swampscott Road northbound approach. This was found to improve traffic operations. A rendering of a new intersection here can be found on p. 175 in Chapter 6C of the report.

Thanks,
Michael

Comment #13

Email sent to Michael Clark on October 7, 2016

FYI. Letter published a few days later in the Salem News. The question remains. Why do the traffic lights in this state permit a left turn signal that only allows a very few cars to turn? The impact on traffic flow is tremendous. Isn't it worth analyzing?
I would appreciate your comments.
Sincerely, Eleanor Chayet

> Sent: 9/14/2016 1:27:22 P.M. Eastern Daylight Time
> Subj: Locals Blast Highland Ave Traffic Suggestions
>
> To Letters to the Editor: I have read the article regarding the proposals to ease traffic congestion on Highland Ave in Salem, Ma. For a long time I have observed the congestion on Highland Ave. where drivers are waiting to turn left onto Marlborough Rd. The signal allows at most, 5-6 cars to turn left at that light. Going in the opposite direction the traffic left turn signal allows many more cars to turn left onto Swampscott Rd. I think it would be worthwhile to make that adjustment to see if it would help with the congestion. The plan to divert the traffic coming from Marborough rd. onto Trader's Way and First St. through the already congested mall and past a neighborhood would be a plan that would represent many headaches in my opinion. Who knows it could save 5.3 million dollars.
> Eleanor Chayet
> Salem, Ma.

Email response from Michael Clark

Hi Ms. Chayet,

Thank you for comments. A series of potential improvements were considered and analyzed relative to the zig zag movements along Route 107. Early on, we analyzed signal improvements including signal phasing and timing optimization. The results showed a minor improvement to the intersection operations. However, particularly at the Route 107/ Marlborough Road intersection, the signal modifications were not enough to remedy the failing levels of service and long delays at these intersections. As such, higher-level improvements were then considered.

Thanks,
Michael

Comment #14

Email sent to Michael Clark on October 18, 2016

I would like to comment on the RT 107 corridor study, specifically the proposal to reroute Marlborough/Swampscott road traffic through 1st Street/Traders Way. I live in the condo community along 1st street and my home is close to the outside of the community along 1st street. The current traffic along 1st is almost unbearable and there is also considerable additional noise from the traffic along Swampscott road especially from heavy trucks coming from the Aggregate business on Swampscott road. These heavy trucks start rolling out very early in the morning (I hear them @ 5 am!). Note: Ch2A pg 9 of your study does not list the fact that 1st street has a heavy truck restriction; I assume this would remain? According to the study, the traffic along 1st street will greatly increase. This is unfair to this condo community and will have a major impact on property values. Keep in mind that a large part of this community are older adults, contribute greatly to the tax income of Salem, and utilize very little of town services (I think there is 1 child that utilizes the school system and the police patrols in this community are essentially non-existent). Nothing in this study addressed the impact to this large, contributing community. Currently, I almost never travel outside of this community during rush hour so on the weekends I feel trapped. I have adjusted my work hours (I travel down Swampscott road to get to work) to avoid rush hour and shop at Market Basket @ 6:30 am to avoid this congestion. I didn't realize when I moved there 3 years ago how much traffic comes down 1st street – and now it could potentially increase greatly!!! I will be watching this project closely. Although not fiscally the best idea, I will plan to sell my home if this project looks like it is going to move forward- before the property values of the condo community decrease. Also, if for some reason I end up still living in this community after this is implemented, I would expect the police to increase their presence near/in this community- try to reduce the drag racing, speeding, etc. and reduce the traffic along Traders Way due to contractors picking up the illegal immigrants (large groups routinely congregate next to the grocery store, in front of the sign that says no loitering!). I will also pursue a real estate tax abatement due to a reduction in my property value.

Joan Bissett
Salem, MA

Email response from Michael Clark

Hi Ms. Bissett,

Thank you for your comments.

-Michael

Comment #15

Email sent to Michael Clark on October 18, 2016

To whom it may concern,

Please, please, please incorporate the revisions recommended by MassBike and its co-advocates for truly safe bike lands on Highland Ave.! In the past few months we have seen, in Cambridge, just how little protection marked lanes give to cyclists. This is the 21st century. We need to prioritize safety, and we need to prioritize transportation options beyond the individual automobile. When the streets are made safe for cyclists, people will get on their bicycles. Let's not wait to experience cyclist deaths in Salem before we start really creating safe corridors for cyclists.

_____

Aviva Chomsky
Salem State University

Email response from Michael Clark

Hi Mr. Chomsky,

Thank you for your comments.

-Michael

Comment #16

Email sent to Michael Clark on October 19, 2016

Hi!

I just got done reading the MassBike/Livable Streets/ Walk Boston advocate recommendations for the Highland Avenue Route 107 redesign and I am loving their recommendations! Their ideas are wonderful and would greatly improve the safety for all walkers, cyclists and drivers in that area. The safety of all commuters should be front and center, especially those that walk or ride that route daily, and the many more that would commute if these recommendations were put into place. Please take the initiative to greatly improve the safety of all commuters now, while we have the chance. So many of our roadways are built just for machines, and so many more people would benefit from a redesign that would include the safety measures they are recommending. The traffic in that corridor is immense and dangerous, a safe, healthy alternative is needed now, so that we can get more people walking and riding, enjoying the fresh air and sunshine, while at the same time re-leaving the traffic congestion. I ask again that you please take into consideration their recommendations. We have the opportunity in front of us right now, to make the changes that would benefit everyone!

Thank you for taking the time to read this!
LeeAnn O'Neil

Email response from Michael Clark

Hi Ms. O'Neil,

Thank you for your comments.

-Michael

Comment #17

Email sent to Michael Clark on October 22, 2016

Dear Senator Lovely, Representative Tucker, and Mr. Clark,

Thank you for your efforts so far to redesign Route 107 less like a highway and more fitting for our community. Your efforts will enhance safe mobility for the length of this corridor. That said, I think MassDOT can do much better. The letter co-authored by Walk Boston, Livable Streets and MassBike is full of excellent recommendations to further improve this route and I support every one of their suggestions. The letter is available here: http://www.massbike.org/route_107

Since I live in Medford you might wonder why I'm interested in this project. I just sold my car and I won't be replacing it. For the first time in 28 years I don't own a car. I commute year round from Medford to Boston by bicycle: rain or shine, cold or hot. My commute is just a little less than the distance from my home to Lynn. It's well within my abilities and interest to use this corridor to cycle to Salem. I have several friends in Salem, many who bike, and one who regularly bikes to Boston - I want safe roads for me and my friends to use.

Please do all you can to incorporate these suggestions to make Highland Avenue a balanced complete street that accommodates driving, walking and cycling.

Thank you.

Matthew Carty
Medford MA

Email response from Michael Clark

Hi Mr. Carty,

Thank you for your comments.

-Michael

Comment #18

Email sent to Michael Clark on October 25, 2016

Good evening Michael,

I am attaching my comments and suggestions to the Route 107 Corridor Study - Final Draft. Please take the time to read my attachment and i would appreciate your hearing your thoughts and comments. Thank you,

Ken Fine
Salem, MA

Email response from Michael Clark

Hi Mr. Fine,

Thank you for your comments. I asked our consultant to review your suggestions and they pointed to the lane barriers, as proposed in the report, serving only to restrict the zig-zag movement (Swampscott to Marlborough and vice-versa) but not motorists accessing these streets from further north or south along Route 107. That is, restricting any type of left turn from Route 107 onto Swampscott or Marlborough would force all motorists accessing these streets to use First Street and Traders Way instead of just those coming from Swampscott or Marlborough under the proposed lane barriers alternative. This was determined to induce an undue burden on First Street and Traders Way during hours of restriction.

The barriers themselves are seen as an enforcement mechanism to prevent the zig-zag movement. A different placement or alignment of the barriers, as you suggest, can be considered in the design phase of the project should this component be advanced.

Additionally, further review and analysis of the intersection at Swampscott Road and First Street would be carried out in the design phase to understand the most efficient way to signalize this intersection, again should this component be advanced.

Thanks,
Michael

Route 107 Corridor Study Report - Final Draft

Highland Ave at Swampscott Rd/and Highland Ave at Marlborough Rd/Traders Way (Zig Zag)

First I want to say that I think your people did a great job in adding the bike lanes and including many improvements to the roadway. My only comments are specifically regarding the ZigZag.

Currently, people have a choice whether to come up Malrboro Rd and take a right on Highland Ave and make a left on to Swampscott Rd .. or.. go straight along Traders Way and turn right on First St. Even if all you did was add a light at First St and Swampscott Rd, more people would choose to go that way. Currently the cars often back up to Whalers Lane and even to Traders Lane and the wait time is unbearable.

I would also say that 70% of the cars take the first option and 30% take the second. I don't think you would recommend 100% of the cars take the first option so why would you send 100% of the cars thru the second option and down thru Traders Way and then on to First St.

So here is my proposal. Since the zigzag backup on Highland Ave both ways is only at **limited times of the day**, why are you restricting cars **24 hours a day.**

I would suggest you install the barriers on Highland Ave but just REMOVE the ones **IN the intersection**. Then post a sign on Marlboro Rd that says “No left turn to Swampscott Rd from 4 to 6 pm (or some restricted time) You could even prevent the light at Swampscott Rd from allowing a left turn arrow. This would allow traffic from Marlboro Rd to turn right into the barrier lane and make a left turn at non-restricted times (mornings, afternoons, evenings, late night, just not at the busiest times)

At Swampcott Rd and Highland Ave, do the same thing, install the barriers in the lane but REMOVE the barriers **IN the intersection**. Have a sign on Swampscott Rd saying “No left turn to Marlboro Rd from 4 to 6 pm (or some restricted time) You could even prevent the light at Highland Ave from allowing a left turn arrow. This would allow traffic from Highland to make a left turn to Marlboro Rd on non-restricted times (mornings, afternoons, evenings, late night, just not at the busiest times)

Also… at Swampscott Rd and First St. DO NOT bend the road to First St. Just put a right lane with a constant arrow. Traders Lane gets backed up now every morning, afternoon and evening and sending more cars there only backs it up more. And you would be re-routing all those huge trucks into the same road. As well as being impossible for cars to enter and exit the businesses on Traders Lane. For those cars that want to do the zig zag and go up Traders Lane, they can like they do now or they can also continue straight on **First St** and end up further down Highland Ave past the congestion.

I feel you might have listened to the many comments at the meetings, but you did not hear or apply any of the comments to the final draft. I hope you will read my proposal carefully and consider my suggests. If you find this does not work, then all you need to do is add the barriers back INTO the intersections and remove the restricted turn signs.

Thank you for your consideration,
Ken Fine
Salem, MA

Comment #19

Email sent to Michael Clark on October 28, 2016

Hello Mr. Clark,

I'm a cyclist who has ridden on 107 and found navigating it to be confusing and at times, unsafe. I support the recommendations outlined here by MassBike: http://www.massbike.org/route_107

Thanks,
Michele Smith

Email response from Michael Clark

Hi Ms. Smith,

Thank you for your comment.

-Michael

Comment #20

Email sent to Michael Clark on October 28, 2016

Hi Michael,

Thanks so much for your leadership and involvement in both this and other Salem projects.

Please accept this as my public comment in favor of multi-modal improvements on Route 107, and particularly, for improving on the proposed MassDOT plan by incorporating the comments submitted by MassBike, LivableStreets, and Walk Boston.

In addition to supporting the recommendations, I wanted to make a couple of suggestions regarding implementation and strategy:

- It would be very helpful if the engineer could provide data to the city of Salem such that we can create transportation demand management programs concurrent with roadway project development, so as to make certain bike-related improvements easier to achieve, both politically and technically. For example, if we wanted to put in a bike lane at the place where it is currently proposed that we drop it in favor of sharrows for a short distance, how many cars would we have to take off the road during the peak hour in order to maintain a LOS of C? Given that this is right next to the high school, it might be an achievable task, if the data is clearly presented to us in a way that all stakeholder groups can understand and act on.

- I can't emphasize enough the importance of incorporating the best possible version of these plans now, and not waiting until later in the design process. I have lost count of the number of times I've been involved in projects, only to be told "Great idea! But sorry, you're too late in the design process, you should try getting involved during the planning phase sometime!" MassDOT talks a big game about having an impact on climate change. But anything short of a fully protected (not just buffered) bike lane will not be enough to start a positive feedback loop between transportation choices and real estate development in this area, and won't have any meaningful impact on greenhouse gas emissions. The best ideas should be incorporated right now, and if people complain because they aren't sure of how the details related to bikes will impact them, you can tell them, rightfully, that those things can be worked out in the design phase. If you feel like it's not politically possible to do right now, you could always incorporate suggestions as "alternative concepts" in an appendix, and at least then have them on the record for future consideration.

Thanks again for considering all this.

Sincerely,
Eric Papetti
Salem, MA

Email response from Michael Clark

Hi Mr. Papetti,

Thank you for your comments.

-Michael

Comment #21

Email sent to Michael Clark on October 31, 2016

Hello Michael,

Aside from addressing the traffic congestion (particularly at the intersection from Swampscott Road to Marlborough Road), 107 desperately needs sidewalks. Some areas require pedestrians to actually walk on 107 (for e.g., corner of 107 and Old Village Road).

Thanks for your efforts in attempting to improve the many issues associated with this main thorough fare.

Regards,
John Stewart

Email response from Michael Clark

Hi Mr. Stewart,

Thank you for your comments.

-Michael

Comment #22

Email sent to Michael Clark on October 31, 2016

107 Highland Ave in Salem is designed to get cars/ trucks into and through Salem. It ignores and does nothing to encourage pedestrian and bicycle traffic and safety. There is considerable speeding on the road. The two lanes encourage this. I propose making it in Salem a one-way road all the way from Lynn to Essex St. The extra space can be used to widen pedestrian walkways and put in a bicycle lane with concrete barriers, one on each side of the road. Many more trees need to be planted. Pedestrian crosswalks should all be raised (speed bumps) increasing safety on the roadway. The speed limit should be 30 mph throughout! All your proposals and their expense will do only a little to improve the road quality. You are tinkering around the edges.

If people arrive in downtown Salem 5 minutes later, no big deal! A beautiful roadway, tree-lined, pedestrian and bike friendly IS A BIG DEAL !!!

Sincerely,
George Milowe MD
Salem, MA

Email response from Michael Clark

Hi Mr. Milowe,

Thank you for your comments.

-Michael

Comment #23

Email sent to Michael Clark on October 31, 2016

Good afternoon,
I have attached my comments regarding the Route 107 Corridor Study in addition to putting them in the body of this e-mail.
Thank you –

Route 107 Corridor Study Comments

Arguments for Installation of Shared Use path on Northern and Retail Sections of Highland Ave in lieu of bike lanes on either side of the street

Michael Williamson
Salem, MA

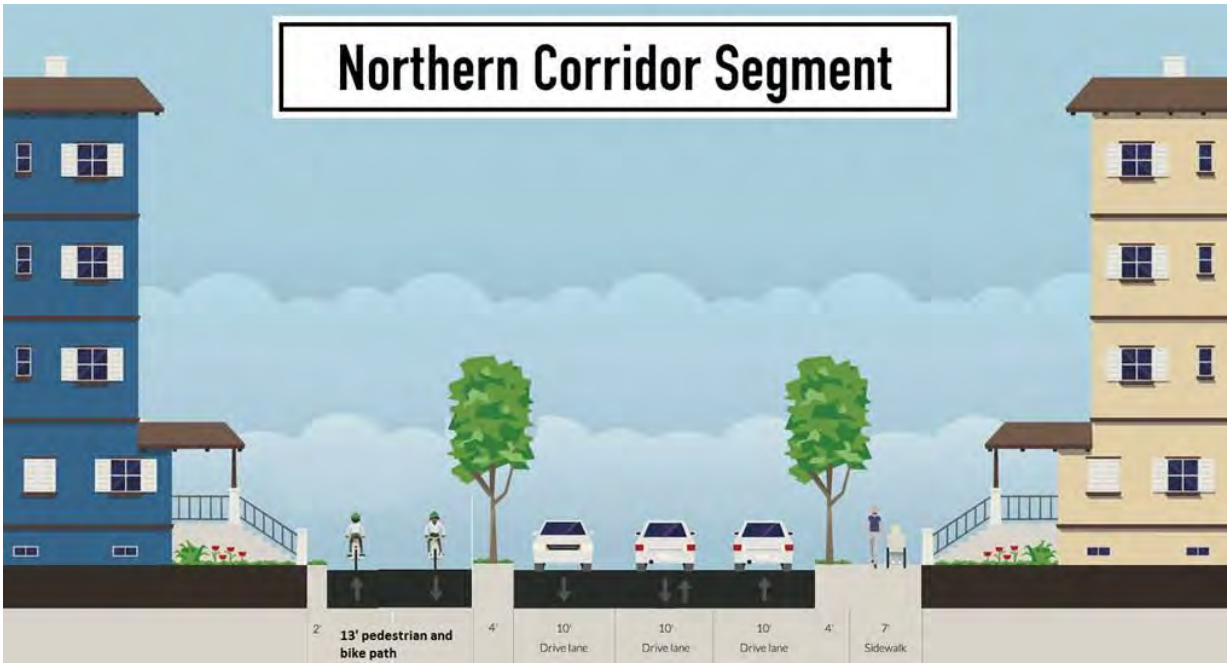
The proposed shared use path would be located on the east side of the street from Dalton Parkway to Hawthorn plaza (Target, Market Basket, & Shaws). The path would take a slight detour at Willson Road (not Willson street), run on the west side of Willson road (on city of Salem property) run into the High School/ Bowditch school property, and then slide back alongside Highland Ave.
The bike accommodations could then, somewhere at Hawthorn plaza, split back into two lanes on either side of the road.
A standard sidewalk would remain on the west side of the street for the duration of the shared use path. A planting strip will be placed between the path and the street.

The advantages to this arrangement are as follows;

- There are very few intersections and curb cuts along this stretch of road, which are typical negatives of a shared use path.
- The "target demographic" for this section of roadway in terms of bicycle and pedestrian usage are K-12 students, who will be much more likely to use a shared-use path than cycle on a major thoroughfare.
- Children and High school students will be more likely to use the path if they don't have to cross the busy Highland Ave on the way to school. The only major street crossing will be at Willson Street, right at the entrance to the High school, which will be marked as such.
- Kids who bike to school unsupervised will simply not cross Highland Ave to bike on the correct side of the street and then cross back. They will (and do) bike on the east side of the road, regardless of which direction they are heading.
- Having one shared use path will allow for more pedestrian and bicycle traffic space since the buffer zones will be reduced.
- Since this stretch of roadway is wide enough for two lanes of auto traffic in each direction, the travel sped will be relatively high, regardless of the posted speed limit.
- The planting strip between the shared use path with actual plants in it (not just grass) at a level higher than the street will provide a much safer (both real and perceived) barrier than a striped buffer (even with poles) or a curb with minimal or no planting strip.
- The options for the northern section include a two-way turn lane, and a shared-use path, but not on the same option. The installation of a two-way turn lane in preferred by motorists, but the two-way turn lane does not preclude the installation of a shared-use path. A fourth option, Two Way, Left Turn Lane, AND SHARED USE PATH, should have been included, and is in my opinion, the most favorable option.

- The section of road in question is a truck route. Having cyclists and trucks on the same stretch of asphalt is inherently unsafe, particularly school age cyclists.

(looking south toward Lynn)



In lieu of a shared use path, I strongly support completely separated bike lanes with a physical barrier for the 107 corridor.

Thank you – Michael Williamson

Email response from Michael Clark

Hi Mr. Williamson,

Thank you for your comments.

-Michael

Comment #24

Email sent to Michael Clark on November 1, 2016

Good evening,

I would like to register my comments on the above-mentioned study.

- Adding bike lanes to Route 107 is foolish and unsafe. This is not a road upon which people would bike. The cost, construction, and consequences to accommodate few if any bikers is unwarranted and not a wise use of limited resources.
- The "zig zag" proposal to divert traffic from Swampscott Road to 1st St and Traders' Way is also a terrible idea. These roads were not built for this use. Traffic is already an issue on these secondary roads at commute times as well as Saturdays. To add more vehicles to an area that is already dangerous (Home Depot, Shaw's, Eastern Bank, McDonald's entrances/exits) is both dangerous and unwise. This is not a well thought out solution to the traffic issues at Swampscott Rd./Highland Ave./Marlborough Rd.

These 2 proposals do nothing to improve the quality of life nor do they address/solve traffic issues in this area.

Thank you,
Debbie

Email response from Michael Clark

Hi Debbie,

Thank you for your comments.

-Michael

Comment #25

Email sent to Michael Clark on November 2, 2016

Dear Sir

I object to certain parts of the proposal for the re-work of Highland Ave (Route 107) and the adjoining roads for the following reasons:

1. The attempt to widen and expand sidewalks will only be reasonable if someone maintains them. I walk down Rte. 107 from and to Swampscott Rd many times and during the winter no one, including the city plows or maintains the sidewalks. I must thus walk on the street. If no one will accept this responsibility then new sidewalks are totally useless.
2. I also bike on Rte. 109 and have never seen any other person doing so. The people in the area are not bikers. Certainly there will always be a few but to allocate money and road space for these few is a waste of effort. Will the new bike paths encourage more people to use them on Rte. 107. I do not believe so. If you study the demographics of the area and consider the uphill nature of the road, there would appear to be only very limited future use. Also, without barriers to separate the bike lanes, the road would still be too dangerous given the idiots who now drive on Rte. 107.
3. The Zig Zag proposal will benefit people who drive thru the area at the expense of the, such as myself, who live there. I live off Traders Way and can barely move through the area now. The new light on Swampscott Rd will help. However, the light at Traders Way and Rte. 107 now allows only 5-6 cars thru at a time. I cannot imagine the congestion with thousands of more cars per day traversing this intersection going both ways. Many time it is impossible to get thru the light at Traders Way and First Street as well and this will create even more congestion for residents to just leave the area.

It seems as though the concerns of the residents of the area are being totally ignored by the DOT and I will never support any plan that creates more traffic coming thru First Ave.

I understand that the Zig Zag and increasing traffic is a problem but before making the significant changes reflected in your proposal, try to change light cycles and use lane painting and control as a cheap alternative.

It would also be advisable to first look at the traffic through Traders Way at the shopping Center and the entrances and exits for cars from the two sides of the shopping are. This is a major hazard that would only be exacerbated by your designs.

Thank you
David Jacobson
Salem MA

Email response from Michael Clark

Hi Mr. Jacobson,

Thank you for your comments.

-Michael

Comment #26

Email sent to Michael Clark on November 2, 2016

Thank you for mailing the study to me, it helped a great deal. My comments are below and I've attached them in a word file as well.

Route 107 Corridor Study Request for Comments

I will try to include page references in my comments to the extent possible.

Page iii: It is mentioned that, I believe in the retail segment, that four travel lanes were added and the median was changed to a raised grass medina lined with trees.

My comments: I think it is a mistake to add trees to any segment of the roadway in the median. I'm assuming existing guard rails would be removed. One only has to notice the number of dents in the guardrails from crashes and then imagine that every dent was caused be a vehicle. Without the guardrail that vehicle could have crossed over to collide with a vehicle going in the opposite direction. I believe there are federal regulations prohibiting the planting of trees within x feet of a highway. I realize this is a state highway, but one would think that planting trees would create more obstacles for vehicles to hit. To remove guardrails would be a mistake. As a side note, when the Nahant Causeway was re-built a couple of years ago the state was going to re-build it without a barrier between the outbound and inbound lanes. Someone at the state level said there was not a need for barriers since there had not been a fatal crash in over thirty years. Then someone educated that state official that the reason there were not any fatals was because of the existing guardrails. Let's not make the same mistake here.

Page iv: The Zig-Zag alternative.

My comments: What would prevent a vehicle existing Swampscott Road from making a right-hand turn onto Route 107 and then making a left-hand turn into Marlborough Road? How would it be enforced? Similarly, vehicles existing right from Marlborough Road making a left onto Swampscott Road, would it be prevented and how enforced? What about vehicles traveling north on Route 107 from Lynn? Would they be able to make a left into Marlborough Road? I see many cars from Lynn contributing to the long queues at Marlborough Road. I also see cars coming out of Swampscott Road making a right turn and blocking both northbound lanes of Route 107, preventing vehicles from Lynn continuing north on route 107.

My suggestions: Paint cross hatching lines in the intersection with "Do Not Block the Box" signage with strong peak hour enforcement. This can be done today without the need of further study. Another suggestion involves the Zig-Zag; try it with temporary restrictions and temporary traffic signals at the First Street and Swampscott Road intersection. I have seen temporary traffic signals in other states, especially at construction sites, so they are available. Installation costs would be minimal. Give the changes a "test drive" before spending millions.

Pages 16 - 18: Turning Movement Counts. Dates of collection, April 2, April 11 for some intersections, and July 30, August 1 for others.

My Comments: I think a study that was made during both School year counts and summer day counts would have produced more enlightening results. As well as studies that included more days, especially a Friday.

I think in more than one place in the study it was mentioned about reducing travel lanes from two in each direction to one each way.

My Comment: I think changes like that would have unintended consequences in that the resulting traffic delays would be considerable more severe than anticipated.
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Thank you for allowing the public to participate in this.

Bill Reilly

Email response from Michael Clark

Hi Mr. Reilly,

Thank you for your comments.

-Michael

Comment #27

Email sent to Michael Clark on November 2, 2016

Mike, good afternoon. I've attended a couple of meetings and they were very informative. I'm reaching to you regarding to section in front of 111 Western Avenue/Chatham Street in Lynn. I own the corner restaurant at that location and your plan shows elimination of parking at that location. I was told repeatedly by local and state officials that it's not the case. Can you clarify?

Sincerely,
Taso Nikolakopoulos, Owner of Johns Roast Beef & Seafood

Email response from Michael Clark

Hi Mr. Nikolakopoulos,

Thank you for reaching out. At each of our study area intersections efforts were made to maintain as much on-street parking as possible while addressing safety concerns. Chatham Street and Chestnut Street both have high crash rates with parking close to the intersections. This can create a hazard since the parked vehicles cause a friction effect on the through traffic, block sight lines, and occasionally block the travel lane when a motorist is maneuvering into or out of the parking position. To address these concerns exclusive left turn lanes are recommended and efforts be made to provide proper clear zones. This effort attempted to minimize the number of on-street parking spaces which would need to be removed to accommodate this improvement but a net loss of approximately 33 parking spaces would be required along Route 107 between Chestnut Street and Waitt Avenue.

Because this segment of the corridor is under the City of Lynn's jurisdiction any recommendations coming out of this study would need to be initiated by the City. Please be in touch with any more questions or comments you may have.

Thanks, Michael

Follow-up email to Michael Clark on November 4, 2016

Michael thank you responding. I agree 100% regarding the safety concerns. I witness it every day. It's a dangerous thru way. It worsened with the addition of the truck route created during the construction of the Central Artery project combined that with the emergency vehicles back and forth the Salem Hospital.

This is why I question the bike lanes in this route. It's far too dangerous for bike lanes. I think bike lanes fit better along the Boston Street Corridor connected with the South side of Western Avenue.
My business has only 3 on street parking spots as it is. If this were to be implemented I have no choice but to sell.

Sincerely,
Taso Nikolakopoulos, Owner of Johns Roast Beef & Seafood

Email response from Michael Clark

Hi Mr. Nikolakopoulos,

We note your concerns and suggestion. Thank you for your comments.

-Michael

]

Comment #28

Email sent to Michael Clark on November 3, 2016

Thank you for the opportunity to comment. Please see attached.

Kathleen Tone
Salem MA 01970

Email response from Michael Clark

Hi Ms. Tone,

Thank you for your comments.

-Michael

November 3, 2016

To: Michael.clark@state.ma.us
107 Corridor Study

Fr: Kathleen Tone
Salem

Thank you for the opportunity to comment on the proposed changes to the Route 107 Corridor. After hearing the presentation and reviewing the report, I would like to focus my comments on two areas:

1. The Zig-zag: the proposal to have traffic re-routed to First Street and Traders Way instead of the current traffic lights at Marlboro and Danvers Rd
I live near the intersection of First Street and Traders Way, and strongly object to the proposal. The assumption that this is a viable alternative is faulty in several ways:

a. Traders Way is, as the term suggests, a "way;" not a street, or a road. The American Heritage Dictionary defines "way" as "a path, affording passage from one place to another." This is exactly what it is and what it was designed to be. It enables people to access Home Depot, Shaws, and the several stores on both sides of the street. Traffic is constantly entering, crossing, and making left turns in order to access the stores. It takes me approximately 8 minutes to travel the space of approximately two blocks to reach the light at 107 across from Marlboro Rd because of all the interweaving traffic. It would be impossible, I repeat, impossible, to turn this "way" into a through-traffic road.
b. First Street is already heavily traveled, and on the weekends and during rush hour it is currently impossible for me to make a left or a right turn onto First; so I avoid it at those times. As with Traders Way, this road was designed as a cut-through and not a through-road or highway. To try to make it so would be unwise and add to the traffic jam that already exists on the road.
c. If the main purpose of this project is it to make people's driving easier and safer, then this proposal must be viewed as unwise and not feasible. Our elected officials believe so, as they stated in the

meeting I attended in Salem. I want to reaffirm their judgment, as someone who lives nearby and drives these roads frequently.

2. The need for bike lanes

I lived in California for 26 years and understand the beauty of bike lanes. The weather is great and the wide and flat roads can easily accommodate the bike lanes. They work very well in the suburbs. However, in San Francisco they do not have bike lanes because of the hills, the narrowness of the roads, and the volume of traffic. I think 107 is not suitable for bike lanes for the same reasons.

At the meeting I attended, a man who is a recognized bikey and a major proponent of bikes, rejected the feasibility of biking on 107. He said it was too narrow, and unsafe because of all the buses and large trucks that frequent the road. He proposed, instead, that the sidewalks be refurbished and made safer. That would not only offer greater safety for pedestrians, it would provide passage for those who might choose to ride their bikes. I second his proposal.

We must examine the underlying assumption of this study that bike lanes are desirable and feasible for 107. In the 3 years I have driven this road I have seen 2 people riding their bikes. Why would you narrow a road that is already too narrow to serve a handful of potential users, at most? While bike lanes are an environmentally good idea, they are not a priority if the purpose of this project is to make people's driving and pedestrians walking safer. Bike lanes do just the opposite: They make the road more narrow and treacherous for drivers and pedestrians. At the risk of being politically incorrect, bikers are not the priority: drivers and pedestrians are. Our tax money needs to be invested to provide the most good for the most people.

Comment #29

Email sent to Michael Clark on November 3, 2016

Dear Michael,

These are comments in response to the recent Route 107 report/ recommendations submitted after the presentations to Lynn and Salem residents. It was a bit surprising to see that, in spite of the discussion at the Salem meeting that adamantly opposed the zigzag proposal, this recommendation persisted in being your top choice. Every day the traffic on First Street and Trader's Way seems to get heavier and delays longer now, even without closing off access to Swampcott Rd. from Highland Ave. As a resident in the Sanctuary Condominiums, getting out of our complex to go most anywhere north usually requires 3-4 signal changes just to get through the lights on RT 107; getting out onto Swampscott Rd. is equally challenging. As well, just turning onto First Street can often be frustrating. We are looking for relief from the current traffic nightmares, not pouring more traffic into our neighbor. For what it's worth, First Street is a residential roadway, never designed for the load of traffic seen on a state highway.

My comments below mostly refer to the proposal to alleviate traffic at the 'zigzag' by rerouting the Traffic to Trader's Way and First Street which I am very opposed to for the following reasons:

1. Currently, a number of drivers already use that route as a cutoff (rather than taking a left onto Swampscott Rd). Most afternoons from 3 p.m. to past 6 p.m. there is a backup of traffic going west on First street (to access Swampscott Rd) back to the light at Traders Way.

   Saturday that backup is throughout the day due to increased traffic going to Hawthorne Plaza and Home Depot and other shops in the area.

   Sending more (? all) traffic that way would result in gridlock and add considerable inconvenience to the residents of the 5 condo complexes on the south side of First Street. Residents there are hopeful that changes will alleviate (not increase) the congestion in that area. Trader's Way is already a traffic nightmare with this being one of only 2 entrances to the Hawthorne Plaza and the only access to Home Depot.

2. If drivers continue as they have already done (finding ways around traffic tie-ups - which many of the mobile apps already do e.g., WAZE), the next 'work around' will be to drive onto Whaler's Lane (which is a continuation of Trader's Way at the First Street light), and will add traffic to a private condo complex, in spite of the fact there are signs saying it is a private community. This will impact both the safety and privacy of the residents in those condo communities. Many people walk or walk their dogs on Whalers Lane and other streets in the complex, and this could impact their safety.

3. First Street is primarily a residential street with signage already on the street (at least from Swampscott Rd to Trader's Way) about no trucks (except deliveries). This proposal will add significant truck traffic to the neighbor, which will also raise additional safety and noise concerns. Particularly of concern is the high level of truck traffic going to and from Aggregate on Swampscott Rd. Not to say anything about the associated noise.

4. Residents residing in the condominiums south of First Street moved there for the peace, quiet and tranquility the area offered. Making First Street a major highway would have a major impact

on the quality of life for those residents. Currently, those living in direct proximity to First Street experience unpleasant levels of noise, pollution from automobiles, and traffic congestion as it is. This would only get worse with the current recommendation. These residents have been awaiting solutions that would reduce the level of noise and traffic there, not increase it.

5. Regarding the overall proposal, there seems to be two issues here: one of design and the other of capacity. It appears that the current design has outlived the capacity - and by cutting down on the width of Rt 107 for bike lanes, etc., cannot have a positive effect on moderating the traffic problems. In fact, it was somewhat surprising to see how much thought, design alternatives and money have been allocated for bike lanes when only 10% of respondents to the survey ever ride a bike in the survey area (90% said they NEVER rode a bike in the survey area).

   Seemed like a lot of attention was given to areas which impact only 10% of the population (respondents). Actually increasing the capacity of travel lanes seem to be more productive than removing some of the capacity. Particularly in the 'zigzag' area, most visits to this area (Shaws, Market Basket, Home Depot, Target, Busa Liquors, TJ Maxx) involve purchase of materials that could not easily be bicycled home. Therefore, there is little need for bike lanes in this area period.

6. On another front, with the increased traffic now at the medical center, having an access from Jefferson St to the hospital has the potential to greatly impact/decrease the traffic on Rt 107.

7. Improving the crosswalks and signals seem to have a lot of merit. A traffic light at the intersection of First St and Swampscott is long overdue.

8. While it may improve the outward appearance of the road, spending effort and money to 'beautify' the medians seems like it should be the lowest of priority; as well it appears these medians may serve to further reduce lane capacity.

One recommendation presented by a participant at the meeting I attended seemed to have quite a bit of merit:

Create an overpass for through traffic on RT 107 at the intersection of Marlborough Rd/Trader's Way. Traffic needing to access the mall, other shops, gas, or Swampscott Rd would be diverted off the main road and reduce the related traffic tie-ups. This mechanism has been very successful at the entrance to the Sagamore Bridge accessing Cape Cod as well as other locations.

The proposed solution to the zigzag may make sense on paper but in practice, it will only move the problem a few blocks down the road, inconvenience residents in the area, as well as impacting their safety and quality of life.

Best Regards,
Linda Ferraresso
Salem, MA

Email response from Michael Clark

Hi Ms. Ferraresso,

Thank you for your comments.

-Michael

Comment #30

Email sent to Michael Clark on November 3, 2016

To All It Concerns Regarding the Highland Avenue/Rt. 107 Highway Design:

I want to express *my* concern and support for a safe design for bicycle access and use on Rt. 107/Highland Ave. The current plans, to my understanding, merely include striped bicycle lanes on the Salem portion of 107 passing Hawthorne Plaza. Given the technology and knowledge regarding the requirements for bicycle safety, the mere striping of lanes, as opposed to physically separated, protected lanes, is highly inadequate and retro in thinking. Many cities all over the United States, including Cambridge and Boston, are implementing protected lanes for the safety of bicyclists. Those cities which have implemented protected lanes have not only seen a great decrease in accidents and fatalities, but have experienced much greater usage by bicyclists.

My understanding regarding the argument against protected bicycle lanes is that the highway along this passage is too narrow to accommodate them. As the former Chair of the Salem Bicycling Advisory Committee, our committee went out and did our own measurements in this area. There was no doubt, given our own measurements, that this area could ***easily*** accommodate protected bicycle lanes. Those who have come to the determination that only striped lanes is sufficient up here for the safety of bicyclists are putting bicycling way down the list of priorities. Furthermore, in addition to the far greater safety that protected lanes provide, bicyclists of all levels are *much* more inclined to use it, whereas particularly on a busy highway such as Rt. 107, only those who are the most proficient bicyclists will be inclined to use it.

I strongly support a redesign to include protected bike lanes on 107/Highland Avenue, and ask that the current design plan be reconsidered.

Jeff Bellin
Salem

For Chairman of the Salem Bicycling Advisory Committee

Email response from Michael Clark

Hi Mr. Bellin,

Thank you for your comments.

-Michael

Comment #31

Email sent to Michael Clark on November 3, 2016

Attached please find my comments as a 17-year resident of Thomas Circle, Salem, MA.

Thank you for your consideration.

-Jane Guy

Jane A. Guy
Assistant Community Development Director
City of Salem
Department of Planning & Community Development
120 Washington St., 3rd Floor
Salem, MA 01970

Email response from Michael Clark

Hi Ms. Guy,

Thank you for your comments.

-Michael

November 3, 2016

Office of Transportation Planning
Attn: Michael Clark / Route 107 Corridor Study
Massachusetts Department of Transportation
10 Park Plaza, Suite #4150, Boston, MA 02116

RE: Route 107 Corridor Study Draft Final Report Comments

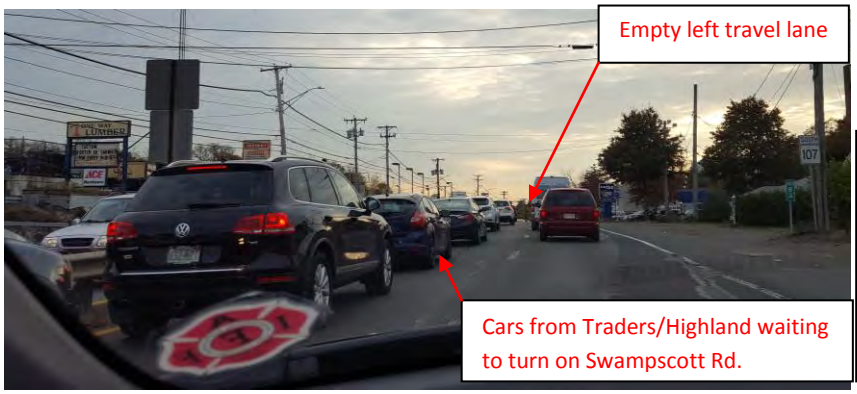
Dear Mr. Clark:

I am a resident of Thomas Circle, ground zero for the traffic problems of the Marlborough/Swampscott Road zigzag. I travel daily to and from downtown Salem for work, frequent Hawthorne Square, Shaws Plaza and Trader's Way businesses and walk/run along Swampscott Rd., First Street, Marlborough Road and down Highland Avenue to downtown Salem.

My comments focus mostly on the section of Highland Ave. from Marlborough Road to Swampscott Road. During rush times, cars traveling from Lynn to Salem on the left travel lane eventually get stuck behind the cars using the turning lane onto Marlborough Rd., forcing drivers to cut over to the right lane and then back into the left travel lane when the road widens to 3 lanes (leaving the left travel lane empty for several car lengths).

Above: At Highland/Swampscott heading toward downtown Salem. During peak hours the turning lane onto Marlborough will back up through the Highland/Swampscott intersection and beyond, resulting in the left travel lane being empty, obstructing traffic flow and causing backups down Highland Ave.

Likewise, cars traveling from Salem toward Lynn on the left travel lane eventually get stuck behind the cars using the turning lane onto Swampscott Road, forcing drivers to cut over to the right lane and then back in to the left travel lane when the road widens to 3 lanes (again leaving the left travel lane empty for several car lengths). Because the Marlborough right onto Highland goes green first, my experience is that the back-up is made up of cars coming from Highland and Traders, rather than Marlborough.



Left: At Highland/Marlborough heading toward Lynn. During peak hours the turning lane onto Swampscott Road will back up to the Highland/Traders intersection and beyond, resulting in the left travel being empty, obstructing traffic flow and causing backups down Highland Ave because not enough cars can get through the intersection.

Regarding the proposed recommendation of using Trader's and First Street to eliminate the zigzag: Trader's Way has several quick-stop businesses for which cars frequently turn in and out. Forcing more cars coming from both directions will make Trader's Way more of a hazard than it already is and will be more of a traffic nightmare to utilize these local businesses. It will just push the same amount of traffic from the wider street designed for moderate movement to the narrower street designed for slow movement and it will move this traffic closer to the residential neighborhood.

- Heading north on Swampscott Road with a required right on First might work, particularly if the green traffic signal at Highland/Traders is increased. However, there would need to be a way for cars to easily turn around on Highland Ave, because they will inevitably miss First street and have to turn left on Highland and need to turn around without having to go too far toward Lynn.

- The elimination of a left turn onto Swampscott from Highland Ave. coming from Marlborough Road through the addition of lane barriers will absolutely not work. There is already a lengthy back-up on First street for people turning left onto Swampscott Rd. Signalizing First/Swampscott will back up the cars onto Traders Way during red lights, as well as for cars turning onto Swampscott Road from either side of Highland Ave. I question being able to precisely time the lights at Highland/Marlborough, Highland/Swampscott, Swampscott/First and First/Traders to keep the traffic from backing up to the intersection before it.

- Although it is not the current recommendation, it is important to say that I do NOT support the installation of roundabouts. They are dangerous, are not pedestrian or bike friendly and would not adequately alleviate the traffic woes.

While there is no fix-all solution, there may be small things that could help ease some of the traffic problems, including increased green light time for the left turns during peak hours. While I strongly support the installation sidewalks and bike lanes to encourage alternative modes of travel, they should only be on one side of Highland Ave. between Marlborough & Swampscott Roads (presumably on the eastern side). For this section, traffic flow needs must outweigh the need for sidewalks on both sides. Space constraints cannot support sidewalks (and maybe even bike lanes) on both sides, because there are currently two lanes that widen to three, when there is a need for three full lanes on both sides of Highland between these two intersections. It is unfortunate, but it would seem land takings on one or both sides to widen the road to allow a full third turning lane (left turn only) on both sides (or at least the worst side, if only one is possible) would alleviate a lot of this back up and make the intersections less dangerous. It would be well worth the cost.

However, another alternative for consideration could be making Swampscott Road one way from Highland to First, forcing the right hand turn from Swampscott onto First for all cars… and then making Swampscott Rd. two lanes in from Highland Ave. (making the left travel lane on Highland Ave a dual straight/left turn lane). It would add less traffic onto Traders Way than is proposed by your current recommendation. It would eliminate the zigzag from Swampscott to Marlborough and would increase the amount of cars able to turn onto Swampscott from the Marlborough/Highland intersection. This would also eliminate the need for lane barriers, eliminate the need for the proposed new signal at Swampscott/First and would not require any land takings.

In any case, I support widening Swampscott Rd. at Highland to create two lanes and making the left travel lane on Highland Ave a dual lane (straight/left turn) onto Swampscott Rd. to move more traffic through the zigzag. I also support the adding of a second receiving lane on Trader's Way from Highland Avenue.

For Figure V1-17, I do not understand the purpose of the lane barrier on Highland Ave on the eastern side of Highland Ave. and feel its removal will save cost. I also strongly oppose the lane barrier on the western side based on my comments and alternatives noted above.

Additional comments:

- Medians should not be planted/landscaped. Plantings require regular maintenance and/or annual replanting (at the taxpayers cost), else they will look horrible. Plantings are not likely to survive snow clearing activities. I recommend using an alternative non-living, but attractive, design.
- I am vehemently opposed to Highland Ave going to a single lane heading toward downtown as shown in Figure VI-21 in order to create a turning lane onto Willson Street. As seen in VI-22, cars utilize both lanes. I drive this road every day, staying in the right lane. I have no issue with cars in front of me turning onto Willson as they move freely at the light and result in no traffic back-up. I do have issue with being in the left lane (or a proposed single lane) and having cars in front of me turn left onto Valley Street, Colby Street, Princeton Crossing, Heritage Drive and Proctor Street, all causing back-ups and forcing cars to move to the right to go around cars turning left. Going down to one lane at on Highland Ave at any of these will increase traffic backups exponentially.

Thank you for your consideration of my comments.

Jane A. Guy
Salem, MA 01970

Cc: Kimberley Driscoll, Mayor
David Eppley, Ward 4 City Councillor
Tom Daniel, Director of Planning & Community Development
David Knowlton, City Engineer

Comment #32

Email sent to Michael Clark on November 4, 2016

Michael

Please see attached comments from Rep. Daniel F. Cahill regarding the Route 107 Corridor. Please let me know if you need any further information.

Thank you

Joe

Email response from Michael Clark

Received. Thank you for your comments.

The Commonwealth of Massachusetts
HOUSE OF REPRESENTATIVES
STATE HOUSE, BOSTON 02133-1054

DANIEL F. CAHILL
STATE REPRESENTATIVE
10TH ESSEX DISTRICT

STATE HOUSE, ROOM 527A
TEL. (617) 722-2020
Daniel.Cahill@MAhouse.gov

November 4, 2016

Michael Clark
MassDOT
10 Park Plaza, Suite #4150
Boston, MA 02116

Dear MassDOT Study Team,

First and foremost I would like to thank you for your work to compile a study to properly address the safety and traffic concerns along the Route 107 Corridor. The Route 107 Corridor is one of the most travelled roads in the City of Lynn so to conduct this study was of utmost importance.

The final report was thorough with specific recommendations but there has been public feedback that expressed concern regarding certain parking restrictions, including off-street parking in front of local businesses. With that being said, I would like to reiterate my desire to stay involved through the process.

I am confident that the lines of communication will remain open and through a partnership with the MassDOT and the City of Lynn we can reach a plan that will alleviate the congestion and increase the safety of the Route 107 Corridor. Thank you again for your time and please do not hesitate to contact my office with any follow up issues.

Sincerely,

Dan F Cahill

Daniel F. Cahill
State Representative
10th Essex District

Comment #33

Email sent to Michael Clark on November 4, 2016

Michael,

Attached is a letter from the Lynn Housing Authority & Neighborhood Development representing comments and concerns for its constituency. Thank you and let me know if you have any questions.

Jeff Weeden
Lynn Housing Authority & Neighborhood Development

Email response from Michael Clark

Hi Mr. Weeden,

Thank you for providing comments from the Lynn Housing Authority & Neighborhood Development. We appreciate your input throughout this effort.

Thanks,
Michael

LYNN HOUSING AUTHORITY
& NEIGHBORHOOD DEVELOPMENT

Administration Office (781) 477-2800
Administration Fax (781) 592-6296
Neighborhood Development (781) 477-2800
Neighborhood Development Fax (781) 593-4350
Rental Assistance (781) 592-1966/TDD
Rental Assistance Fax (781) 586-9478

10 Church Street
Lynn, Massachusetts 01902

Executive Director
Charles Gaeta

Curwin Circle Management Office (781) 598-3663
State Housing Management Office (781) 592-1966/TDD
Wall Plaza Management Office (781) 592-4038
Maintenance Office (781) 598-3434
Family Investment Center (781) 595-5089
Application Intake & Screening (781) 581-6105

November 3, 2016

Office of Transportation Planning
Attn: Michael Clark / Route 107 Corridor Study
Massachusetts Department of Transportation
10 Park Plaza, Suite #4150
Boston, MA 02116

Re: Route 107 Corridor Study

Dear Michael Clark:

The Lynn Housing Authority & Neighborhood Development (LHAND) has been actively participating in the Route 107 Corridor Study. As you know, The Massachusetts Department of Transportation (MassDOT) initiated the Route 107 Corridor Study to evaluate existing transportation conditions along the corridor, assess the potential of future development and economic growth in the corridor, and to develop both short term and long-term improvements for all modes of travel. LHAND's specific interest is the neighborhood impact between Chestnut Street and the Lynn/Salem border. As such, LHAND has concerns that will be submitted during the final public comment period. These concerns are as follows:

Traffic entering Lynn from Salem at Cain Road. This is one of the more dangerous sections of the corridor, where speeds drastically change and two lanes merge into one. Concern has been shown that because it is not an intersection, this stretch did not receive the crash data consideration. It is imperative to see improvements to slow speeds and facilitate the lane merger.

Walmart Drive improvements. There is currently flooding issues that affect Highland Ave in front of this intersection. It is not uncommon for this road to be shut down during heavy rain forcing drivers to use the Wal-Mart parking lot heading south. Is there opportunity to address drainage and infrastructure conditions that affect the neighboring communities?

No U Turn signs along Highland Avenue. There are currently No U Turn signs extending from Wal-Mart to Marlboro Road which force drivers to divert Highland into shopping centers or side streets to go south. Also, the No U Turn sign at the end of the median by Cain Road forces cars and trucks to use Belleaire Ave or Buchanan Circle to turn back to Salem, impacting residents and neighborhoods.

Thank you in advance for you time and attention to these neighborhood concerns. If you have any questions please do not hesitate to contact me at your earliest convenience.

Sincerely,

Charles Gaeta
Executive Director

Comment #34

Email sent to Michael Clark on November 4, 2016

My name is Jonathan Brideau, a local cyclist from Beverly. I ride my bike to and from Boston weekly to work when I can. I have tried several routes, and have been intrigued with the possibility of using 107/Highland Ave but have chosen to avoid. This corridor is one of the true “eye sores” of the North Shore. As a driver who has used it, it is intimidating and frustrating. I could not imagine using it as pedestrian and yet I see many of the local folks who need to walk to several businesses try their best with poor facilities to allow them to do so safely.

These reasons above ultimately stopped my purchase of a house along 107 two years ago with my wife. I could not imagine living along this road given the above. How does a community allow their families to use something like that in anything but a car and a seat belt is beyond me. It is so uninviting as a pedestrian or cyclist.

I work in several key metro areas across the country organizing the charity event, the Best Buddies: Challenge in San Francisco, Los Angeles, Miami, and for a time Washington, DC. I have traveled with my bicycle hundreds of times to these locations, and have spent countless days commuting and traveling within their neighborhoods. Some are better than others. The problem I see is a lack of true coordination with key partners. There are too many examples of local communities implementing old substandard facilities when they have the capital, knowledge, and support to do much more. Unfortunately, the next round of improvements comes decades later, and many of their residents do not ever see these changes. More importantly too many people are hurt or killed because of poor design. More progressive communities push for excellence to create a truly connected neighborhood for all users that is not only safe, but inviting to use by bike and foot rather than just the automobile. With vehicle traffic and obesity problems rising daily, simply giving residents an inviting option to walk or cycle a few blocks from their home to work/school could solve these problems. Too often this is pushed aside for a cheaper design for more vehicles.

I strongly urge all of you to consider the written comments from our advocacy groups and their recommendations to improve design. To provide continuous, physically separated bike lanes along the entire corridor rather than bike lanes with just a painted buffer, as currently proposed. These painted bike lanes are not the answer, and you can go to many cities that will tell you it is not enough with their list of fatalities and brutal accidents from distracted driving. Please use the principles in the MassDOT separated bike lane design guide to create protected intersections at all road crossings and major retail development entrances. Please widen sidewalks and plant additional trees throughout the corridor. These things have been proposed and I ask that you consider them before creating a temporary fix that will NOT better the community.

Thank you for your time and consideration on this matter.

Sincerely,
Jonathan Brideau

Email response from Michael Clark

Hi Mr. Brideau,
Thank you for your comments.
-Michael

Comment #35

Email sent to Michael Clark on November 4, 2016

Hello,

Thanks for presenting the results of the Route 107 traffic study to Salem residents.

As I stated at the meeting, I live on Aurora Lane, parallel to and one block from First Street. During busy times, it can take me 10 minutes to make my way up Traders Way and through the light at the junction of Traders Way and Highland Ave. The First Street / Traders Way section of roadway seems to be at capacity already. It's already tricky getting into and out of the store parking lots along Traders Way. I cannot imagine adding more congestion to what already exists.

Furthermore, we have the pleasure of living in a quiet and safe neighborhood while still living close to everything we need (stores, downtown, etc.). Re-routing main throughway traffic right next to our neighborhood will surely change the peaceful ambiance of the place we have chosen to live.

For these reasons, I strongly oppose re-routing zigzag traffic down Traders Way and First Street.

Thank you for allowing me the opportunity to comment.

Sincerely,

Nancy Gilberg
Salem, MA

Email response from Michael Clark

Hi Ms. Gilberg,

Thank you for your comments.

-Michael

Comment #36

Email sent to Michael Clark on November 4, 2016

Dear Mr. Clark,

Attached please find my comments letter for the Route 107 Corridor Study. Hard copy to follow by mail.

Thank you.

Best regards,
Joan

Senator Joan B. Lovely
Second Essex District
State House, Room 413-A
Boston, MA 02133
Phone: (617) 722-1410
Fax: (617) 722-1347
Email: Joan.Lovely@MASenate.gov

Email response from Michael Clark

Hi Senator Lovely,

Thank you for your comments. We appreciate your office's participation throughout this process.

Thanks,
Michael

The Commonwealth of Massachusetts
MASSACHUSETTS SENATE

SENATOR JOAN B. LOVELY
Second Essex District

STATE HOUSE, ROOM 413A
BOSTON, MA 02133-1053
TEL. (617) 722-1410
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JOAN.LOVELY@MASENATE.GOV
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Chair
STATE ADMINISTRATION AND REGULATORY OVERSIGHT

Vice Chair
CHILDREN, FAMILIES AND PERSONS WITH DISABILITIES
and
MENTAL HEALTH AND SUBSTANCE ABUSE
and
MUNICIPALITIES AND REGIONAL GOVERNMENT

November 4, 2016

Office of Transportation Planning
Attn: Michael Clark / Route 107 Corridor Study
Massachusetts Department of Transportation
10 Park Plaza, Suite #4150
Boston, MA 02116

Dear Mr. Clark,

Thank you for this opportunity to submit comments on the Route 107 Corridor Study Report published on October 5, 2016. I would also like to thank MassDOT for the inclusive work that has gone into this process to date. As the state Senator for the Second Essex District, and member of the Route 107 Working Group, I write to express my support for, and opposition to, specific traffic mitigation plans outlined in the Report.

As you are aware, the goals of the Route 107 Corridor Study seek to improve mobility, connectivity, and safety for all transportation modes and users along the corridor; support local economic development; and improve the quality of life for residents and businesses in the corridor. The Report outlines many improvements for vehicular, pedestrian and bicycle travel along the route, and I support those improvements. However, the proposed plan to redirect and shift all traffic from Marlborough Road and Swampscott Road (the so called "zig-zag") onto Traders Way and First Street, unfortunately, does not meet the goals of the Study, and will only relocate traffic congestion from one area to another without actually mitigating traffic at all.

As you are aware, at peak hours, traffic currently backs up on First Street heading towards Swampscott Road. By adding all traffic from Marlborough Road to Traders Way and First Street will only redirect the problem from Highland Avenue to an already busy area used by customers of the dozens of businesses along Traders Way (with emphasis on Home Depot) and the thousands of residents who live on and off of First Street.

Additionally, during the public review process, you will recall that many residents expressed strong opposition to the proposed plan to redirect traffic from Marlborough Road and Swampscott Road to Traders Way and First Street as outlined above. I wish to be recorded as

opposed to this proposed recommendation as it will not meet the goals of the Study to improve mobility, connectivity, and safety for all transportation modes and users along the corridor; support local economic development; and improve the quality of life for residents and businesses in the corridor.

Therefore, I respectfully request that further study be completed to amend the proposal including appropriate land takings, if necessary, and I look forward to working with MassDOT to accomplish the Study's goals.

Sincerely,

Senator Joan B. Lovely

Comment #37

Email sent to Michael Clark on November 4, 2016

Hello,

I am Joseph O'Neil. I love that the city and state are planning to reconstruct this area. However, the designs thus far are conservative and out-dated. There is a ton of new information out there for bicycle infrastructure. For instance, the painted bike lanes that we have done for decades are beginning to raise questions in regards to safety. They were once great and innovative concepts, but experience over the years has detected flaws in the design. This is a great opportunity to explore bolder and new ideas in regards to bicycle infrastructure. I encourage all involved to researched and work with organizations such as MassBike, Livable Streets and WalkBoston. These are powerhouses of information that can turn these conservative designs into something that will set a tone for the rest of the infrastructure on the North Shore.

A protected bike lane was once purposed on Lafayette Street in Salem. Unfortunately, this brought much animosity to the neighborhood and was ultimately shot down. Recently, a member of Salem State University's faculty got doored on this street during their bicycle commute. Situations like this are extremely dangerous and easily avoided through modern infrastructure.
Safety is not the only issue, but bicycles bring business! Imagine if it was possible to safely ride to the big box stores on 107. It has to potential to completely redesign the neighborhood. It is also a direct corridor between the North Shore and the Boston Metro area. Much business is being lost by not having sufficient facilities.

The last point I want to make is that there is a finite amount of space for cars and trucks. Parking lots and wider roads will eventually cease to be an option. Building roads that only cater to motorists is slowly evolving into a dead end idea. Congestion is already picking up and is a main concern with this reconstruction project. Providing alternative options is the most viable solution to the car epidemic.

Thank you for your time,
Joseph O'Neil

Email response from Michael Clark

Hi Mr. O’Neil,

Thank you for your comments.

-Michael

Comment #38

Email sent to Michael Clark on November 4, 2016

I have read through both the final draft report by MassDOT and the more bike-friendly one supplied by MassBike. I have looked at the diagrams for both and I respect the level of civil engineering that has gone into this plan at all 3 location sections.

I don't pretend to know what is best when it comes to the flow of multi-faceted traffic use but I am always excited as a bicycle owner and citizen to know bike travel is always part of the plan. I would prefer the more bike-friendly designs as a citizen of Salem that MassBike has presented but understand the situation with trying to mitigate automobile congestion. I'm writing to have my and my wife's concerns counted, even if non-numerically and just an overall feeling of the increase of bike riders in cities.

Thank you to Somerville and Cambridge (my previous home) for their bike improvements and now thank you personally to Salem and the North Shore (my new home!) with these bike plans, making it safer for bike commuters to use these travel arteries. May the best plan come to a beautiful fruition.

Jimmi Heiserman
Salem, MA

Email response from Michael Clark

Hi Mr. Heiserman,

Thank you for your comments.

-Michael

Comment #39

Email sent to Michael Clark on November 4, 2016

Michael,

I am writing in support of plans for 107 including bicycle infrastructure - either protected bike lanes or wide multi-use paths. As we plan long term for roadways, we need to ensure that we are taking all users equally into account.

Heather Famico
City Council, Ward 2
City of Salem

Email response from Michael Clark

Hi Councilor Famico,

Thank you for your comments.

-Michael

Comment #40

Letter sent to Michael Clark on November 4, 2016

Thank you for allowing residents to comment on the impending changes to highway Rt 107 Lynn/Salem corridor. You may recall our meeting at one of your comment sessions in Lynn.

I have two properties that front and border this road and have been a life resident here for my entire life, retired and thankful for the opportunity to share some thoughts and concerns.
Am of the firm belief that this artery must be kept free and clear of any traffic slowdowns since since it impacts the quality of life in our neighborhood, lowers property values, creates a safety hazard for emergency vehicles frequently on route to both Salem Hospital in Salem and Union Hospital in Lynn.

1. The traffic congestion at the intersection at Eastern and Western Avenue will be bottle necked with the planned addition of a working traffic signal. A simple blinking signal with yellow facing Western and red blinking on Eastern/Stanwood. Add a dotted line to delineate lanes on the approach southbound starting from Linton Road and the traffic will flow easily though in all directions without being impeded. Also regarding the idea of limiting traffic to only right hand turns from Eastern to Western and moving the southbound traffic to the Waitt Avenue signal light will surely back traffic up solidly at the Eastern Avenue fork since turns will be limited to one choice only.
A real bad idea since this area of RT 129 receives all westbound traffic from Swampscott and Lynn Shore Drive especially at drive times.

2. Your configuration for a bike path on a state highway needs reconsideration. The Rt107 roadway is very narrow at the Floating bridge and makes bike travel life threatening. A better suggestion to contemplate might be to re-route the traffic around the bridge to Victory Road avoiding the possibility of accidents. By way of information, you won't be the first to do this since the Ringling Bros Circus first created this pathway around the floating bridge because the elephants reared up and refused to cross the pontoons. The circus workers intent on getting the animals to the circus destination in Salem carved and chopped their way through the woods to make the trip. The Lynn city fathers called it a "victory" and named the road after the event.

3. Lastly, The proposed changes at the Marlborough and Swampscott Road intersection at Rt 107 is surely going to create problems in all directions. This traffic clog is due to the poor planned expansion and overbuilding of large apartment units that dump hundreds of cars

into the area. There's no doubt that the purpose of this density is rooted in the fact that Salem wants to garner as much tax revenue from Highland Avenue strip as possible and the state planners have been complicit in this.
Your plan to re-route traffic from Swampscott Road to the intersection of 107 past the Pancake House will result in a massive traffic jam. Add the Marlborough Road traffic only being allowed to turn right and travel all around in a circle in order to go left towards Salem will be a virtual nightmare. what's needed is a righthand turn onto a road off Marlborough bis headed southbound on 107 behind the mattress store that will channel all traffic heading in that direction to a road on the other side of the hill located across from the Irving Gas Station. For all traffic going headed northbound on 107 toward Salem, there should be a left hand turn behind CVS that will lead you to a road past the Dunkin Donut Kiost drive through to the Market Basket intersection. That will alleviate traffic and allow for smooth transition for the Swamspcott Road traffic moving west toward Peabody to pass through. Thanks for allowing me to comment and I hope this helps?

Good Luck!

Peter Frangipane
Lynn, Mass. 01904

PS: Would suggest a blank paper flip chart and tripod with heavy black markers to use for your comment sessions audience. It's been my experience some have difficulty explaining in words what can be easily be drawn out on paper. The best part is that your staff gets to take the picture back to the office for reference.

P.L.F.

Email response from Michael Clark

Thank you Mr. Frangipane.

Comment #41

Email sent to Michael Clark on November 16, 2016

Michael,

Here are the combined comments from the Salem Engineering and Planning departments.

Tom

Tom Daniel, AICP
Director of Planning and Community Development
City of Salem
120 Washington Street
Salem, MA 01970

Email response from Michael Clark

Hi Tom,

Thank you for submitting comments on behalf of the Salem Engineering and Planning Departments. Regarding points raised in the letter:

- MassDOT is receptive to opportunities to improve this cross-section provided new ideas satisfy study goals, such as improving multimodal mobility, improving safety, and addressing community, health, and social equity effects. This discussion would need to take place in the design phase. The cross-section concept settled upon for the Retail Segment of the study corridor was achieved through Working Group consensus. Three improvement alternative concepts were put forward (Figures V-15 through V-17), with consensus reached on the viability of the recommended option (Figure VI-4).

  The cross-section concepts recommended in this study, particularly when paired with intersections, seeks to address various constraints that were found owing to the geometry of intersections, traffic operations, and access to businesses, among other considerations. The design phase of the project can address these specific problem spots.

  Future consideration of this cross-section is required to ensure proper delineation between pedestrians and bicyclists, which would likely include use of different pavement materials to separate the two spaces and may require widening of the shared-use space to ensure a safe passing distance between the two types of users.

- The study team notes potential improvements to the edge of the roadway, particularly as a landscaped buffer between vehicles and pedestrians/bicyclists. Figures V-15 and V-16 detail improvement concepts which would provide this protection. As with the point above determination of the improvement concept would need to be taken in the design phase but provided a concept like this achieves study goals MassDOT is receptive to different options. Drainage impacts are outside of the scope of this planning study.

- The 10’ planting strip as proposed in the recommended alternative (Figure VI-4) includes a 1’ buffer space on each side of the raised median to separate the fixed object from the travel lane. Working Group consensus throughout the study spoke to keeping the median in the Retail Segment of the study. The decision on a 10’ median was in recognition of the need for left-turn lanes at various intersections, as the roadway is currently configured.

- The traffic signal at the Highland/Dalton/Jackson interchange would be timed to prevent excessive queuing on Route 107. Cyclists turning right onto Dalton Parkway/Jackson Street should be able to intuitively use the right-turn lane and additional shared lane markings can be added at this location in the design stage.

- Elaboration of the shared street concept for Essex Street at Boston Street will be provided in the report. The idea behind the concept is create new open space and a plaza-style environment created by realignment of the intersection. Due to the driveways at the intersection a “shared street” would allow for continued access to businesses at this intersection. Entry and egress through the driveways by motorists would need to be made obvious by markings in the pavement of the road or within the different material or texture of the new space itself, signage, and orientation of the space itself. For instance, cut-through movements by motorists traveling northbound along Highland Street to avoid the traffic signal would need to be made unviable, which can be achieved through visual cues and fixed objects in the shared space. A decision to implement the “shared street” space would be the choice of the City of Salem, and orientation of the space itself determined in the design phase.

- A roundabout was explored at this space and found to not be feasible because there would be right-of-way impacts and the close proximity of the fire station would present safety and operational challenges.

Thanks,
Michael

City of Salem Route 107 Corridor Study Comments
11/15/2016

Comments with Attached Design Change Document PDF

1. Generally, the MassDOT study recommended motor vehicle lane use strategy is appropriate.

2. Consider an alternate cross-section treatment for Highland Avenue to create continuous multi-use pathways (pedestrian sidewalk with bike accomodations) on both sides of Highland Avenue. Eliminate the need for stanchions within buffered bike lanes (aesthetic and maintenance concerns). This works well throughout much of the corridor, with a few tight locations. This is compatible with the Salem Bicycle Advisory Commission's desire to have separate bike accommodations through this corridor. (see pages 1-4 of attached pdf)

3. At intersections, consider minimizing the bicycle conflict areas by employing the Dutch crossing method. By placing non-motorized demands off the street, a larger group of users will be able to take advantage of the available multi-use pathways. Traffic and pedestrian/bike clearance intervals will be mininimized to keep pedestrian and traffic delays as short as possible. (page 6, bright green crossing at Swampscott Rd in attached pdf)

4. At Swampscott to Marlborough Road (zig-zag area), do not restrict movements; make intersections safer, but retain ability to for the Swampscott Road, Highland Avenue, Marlborough Road maneuvers to continue. Remove all the stanchions for the lane designations. Address First/Swampscott Road per recent Stantec study of options (page 6 attached pdf).

   Recommend moving the crosswalk up to the corners of the road, put in a bike box on the Northbound and Southbound side before the crosswalk, to allow for bicyclists to safely get in the queue to take a left.

5. Consider retaining the typical four 11-foot lanes of travel from Willson Street to the Lynn line with auxiliary turn lanes as needed at intersections. (see attached suggested cross sections on page 4 of pdf). Where width permits, add a greenspace/utility corridor to Highland Avenue adjacent to the curb. (see page 5 of attached pdf for aerial view)

General Comments On Chapter 6 Recommendations

Address drainage impacts mainly through catch basin inlet relocations, assuming the drainage system is not in need of replacement. If it is in need of replacement, drainage costs would be similar to the alternative shown in the Draft MassDOT Study report.

What is the reasoning for increasing the center median to 10ft in place of the guard rail? Can the center median be less wide to add increased width to non-motorists (multi-use path, or planted buffer)?

Can street trees be added as a buffer between sidewalks and bike lanes as a visual mechanism to slow traffic and decrease "highway-like" perception?

Highland and Jackson St and Dalton Pkwy

Northbound right-turn only lane at Highland/Jackson has been repainted as a straight through and right arrow so recommended configuration puts bicyclists at risk going straight as they have to cross a lane of traffic to get back into protected bike lane.

Highland and Boston St and Essex St

"Shared street" markings might be confusing for road users and may not be clear for multiple uses of this intersections. This configuration may create access problems for property owners with driveways that exist at the proposed shared street sections, particularly at ASAP Drains.

What is the proposed location for the Choate Memorial Statue at this intersection, assuming it will remain?

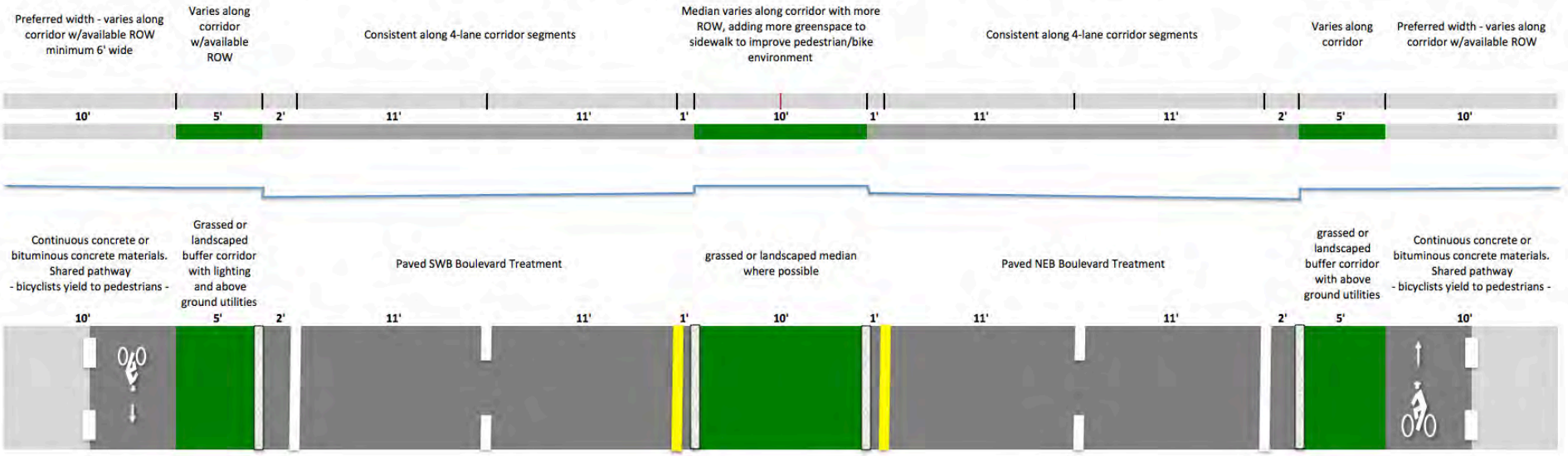
We are concerned about the possible conflicting programming of the "shared street" space beyond pedestrian and bicycle transportation access:

- Parking for businesses
- Cut-throughs in high traffic volume Northbound from Highland to Essex
- Restaurants could ask for outdoor seating on mixed use space – conflict between traffic flow and outdoor seating

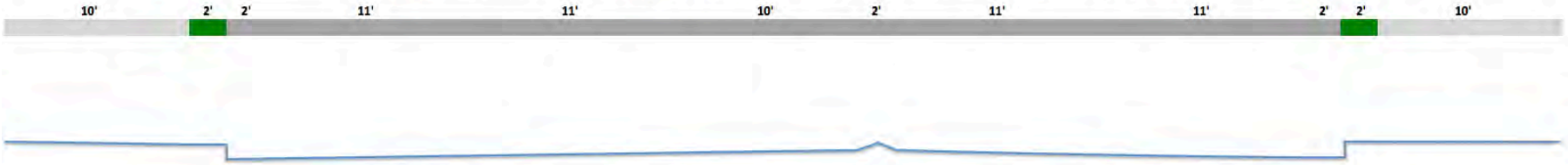
Has there been any consideration of a **roundabout/rotary** at that intersection with the Choate Statue and landscaping at the center. A residential scale rotary would be appropriate method of travel to entrance of the McIntire Historic District.

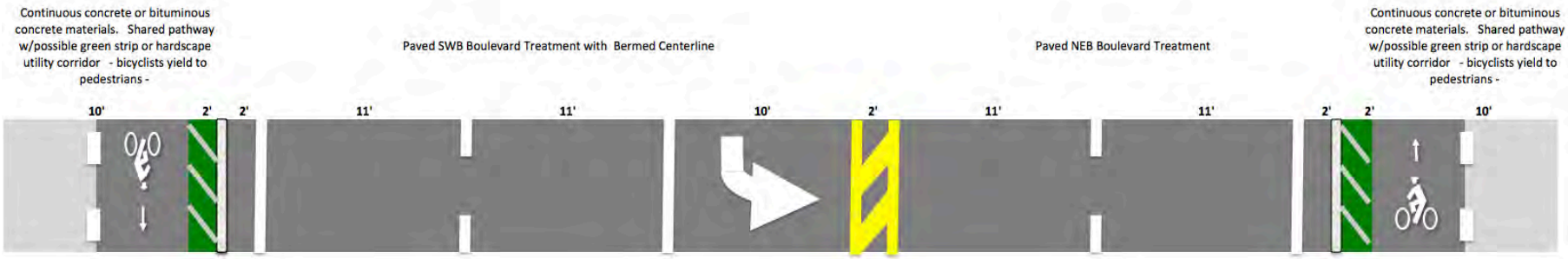
Crosswalks could be implemented with bump outs to shorten the distance to the cross walks at that intersection, in particular Mandy's Pizza and the sub shop.

EXAMPLE 1 - SUGGESTED TYPICAL LAYOUT FOR MAXIMUM 90' ROW SHOWN WITHOUT BUS STOPS - WITH BUS STOP INCREASE CURB WIDTH AND TRANSITION TO NARROWER MEDIAN

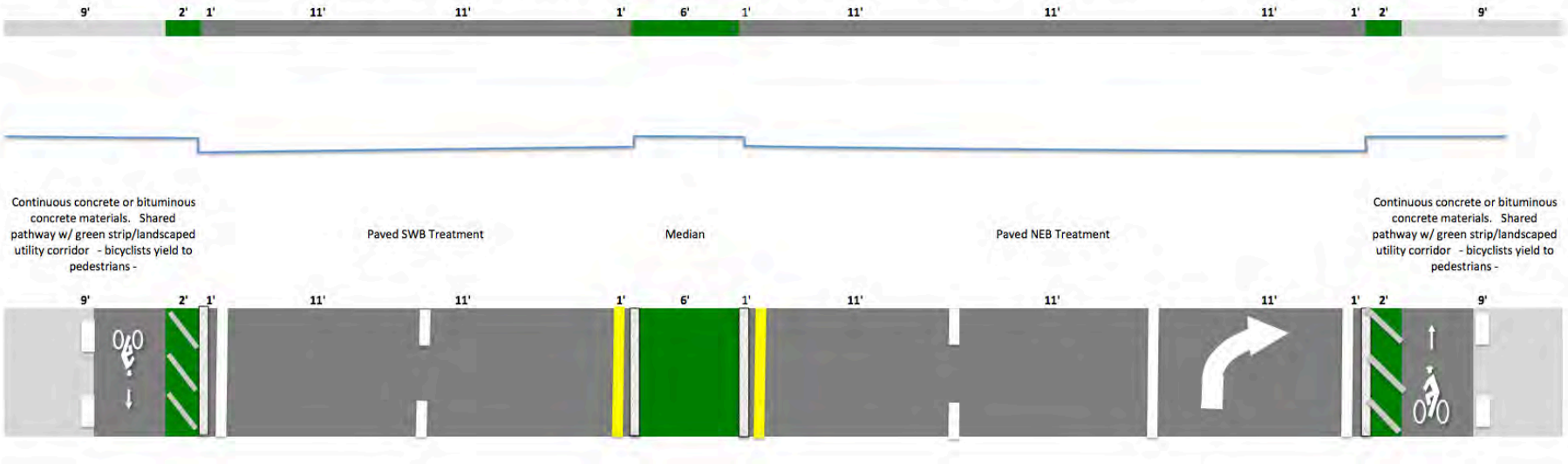


EXAMPLE 3 - SUGGESTED TYPICAL LAYOUT FOR 84' ROW - NORTHEAST OF SWAMPSCOTT ROAD INTERSECTION

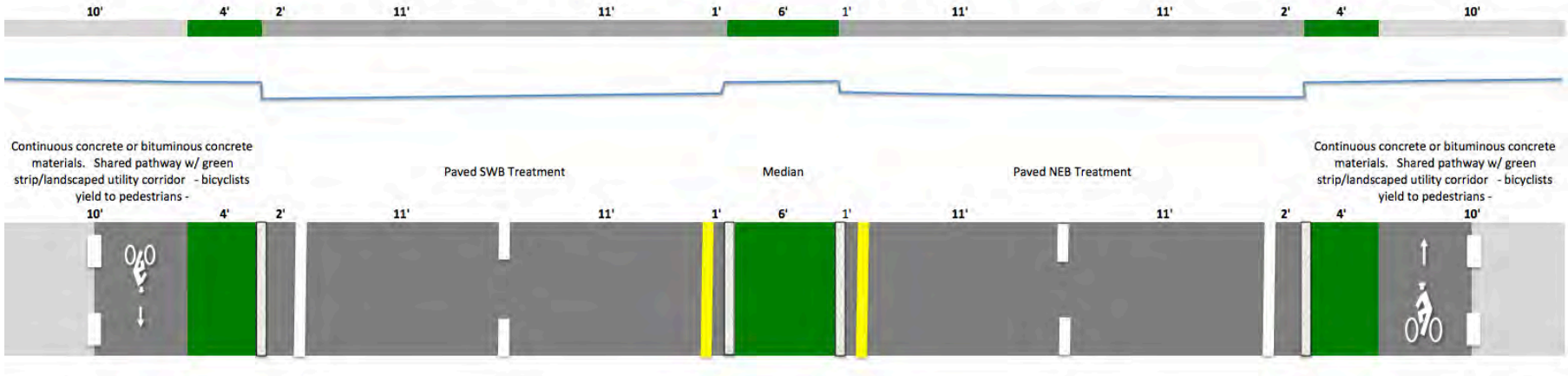


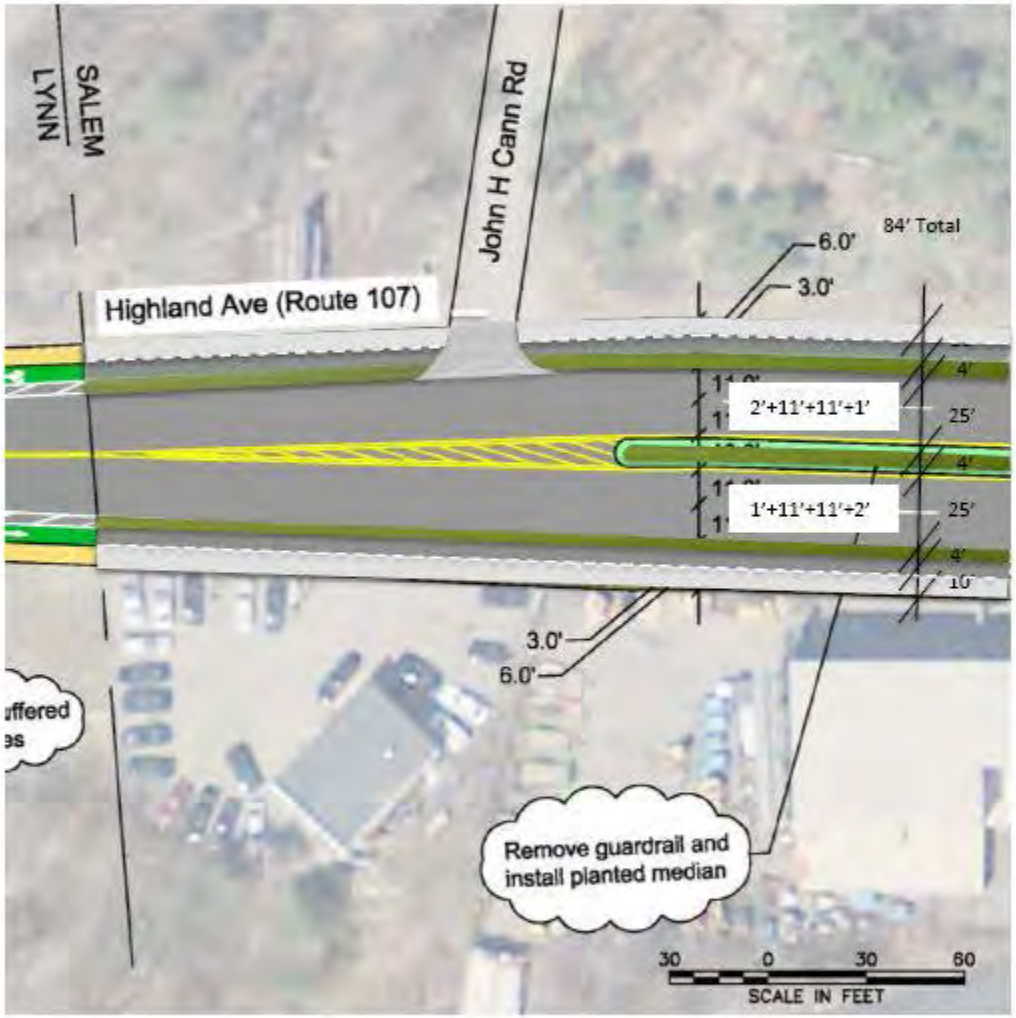


EXAMPLE 2 - SUGGESTED TYPICAL LAYOUT FOR 87' ROW - SOUTHWEST OF SWAMPSCOTT ROAD INTERSECTION

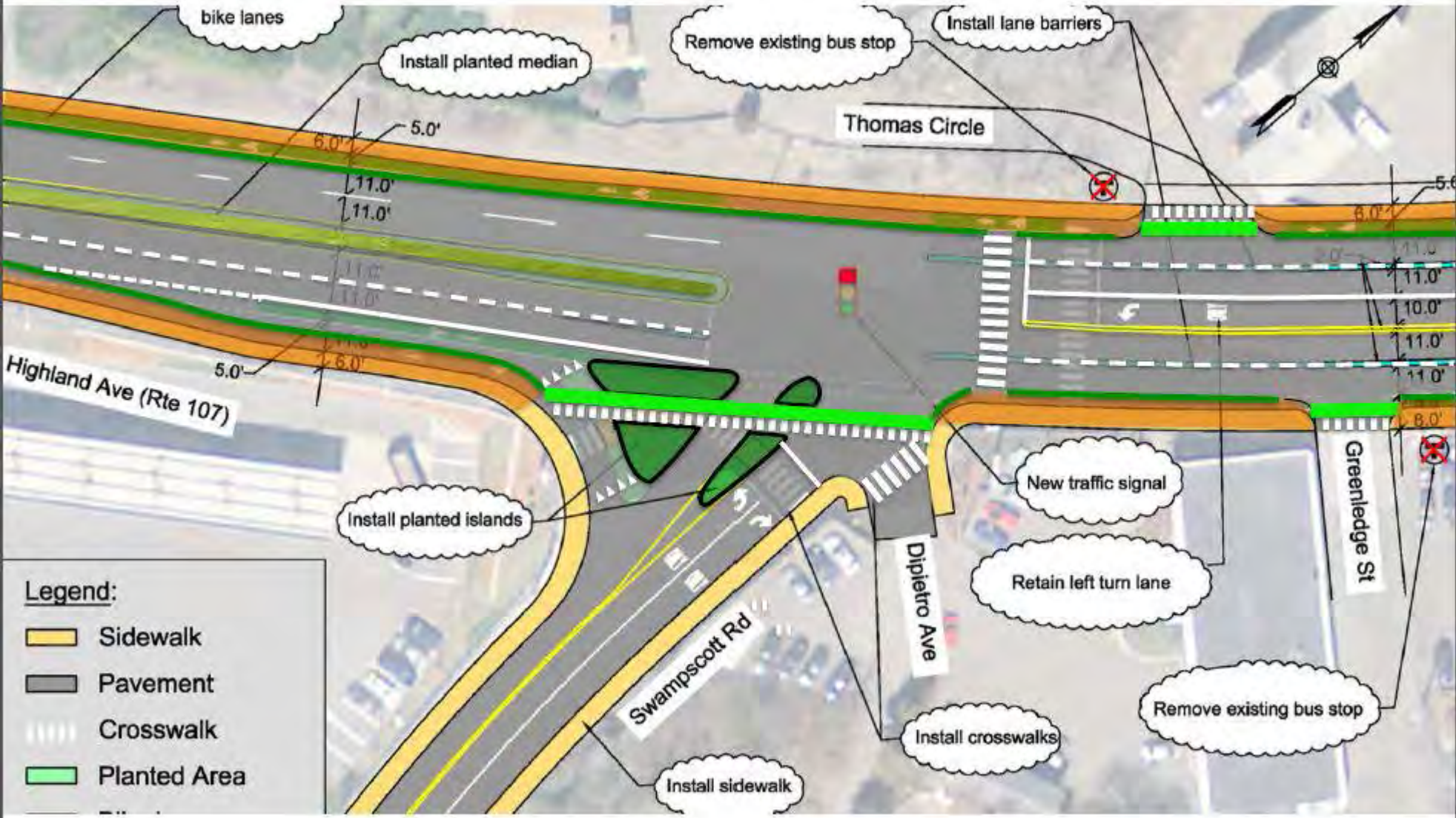


EXAMPLE 4 - SUGGESTED TYPICAL LAYOUT FOR 84' ROW AWAY FROM INTERSECTIONS





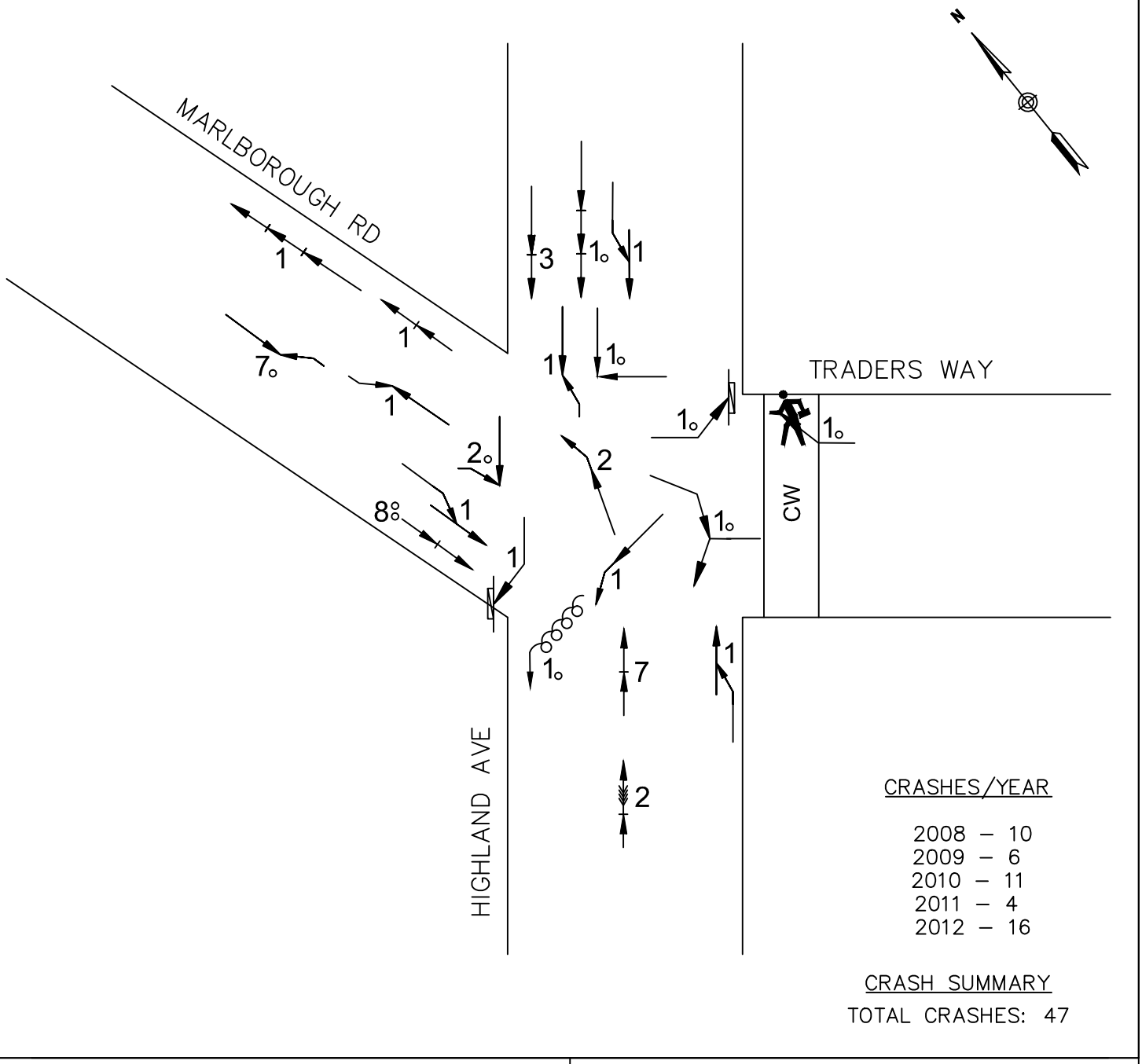
Rough concept sketch for illustrative purposes only -- basemap from MassDOT DRAFT REPORT.



Rough concept sketch for illustrative purposes only -- basemap from MassDOT DRAFT REPORT.

APPENDIX E

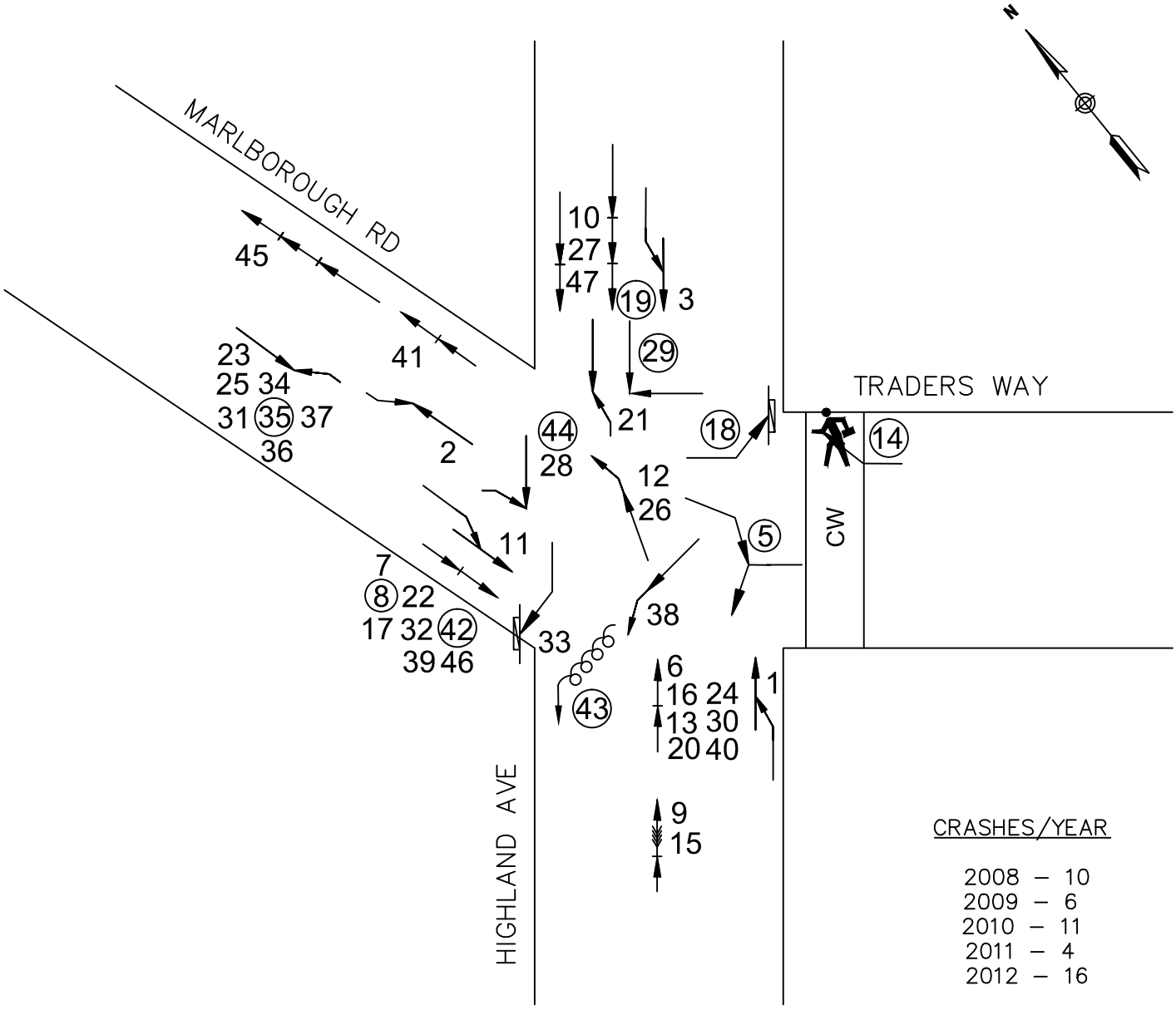
Crash Data



SYMBOL	ACCIDENT TYPE
MOVING VEHICLE	REAR END
BACKING VEHICLE	HEAD ON
PEDESTRIAN	SIDESWIPE
CW CROSSWALK	OUT OF CONTROL
PARKED VEHICLE	LEFT TURN
FIXED OBJECT	RIGHT ANGLE
INJURY ACCIDENT	

McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

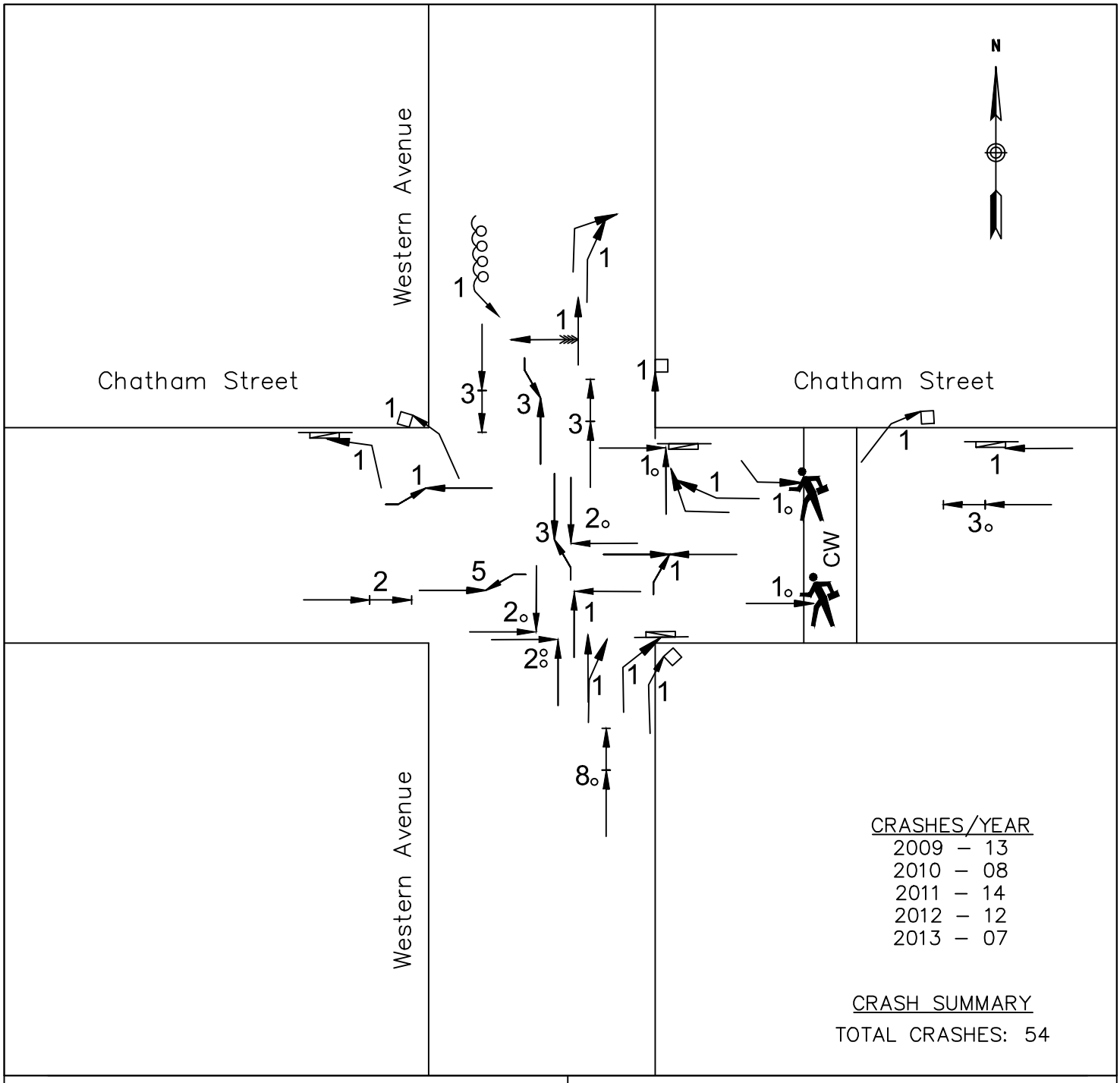
Highland Ave. at Marlborough Rd. / Traders Way
Crash Diagram 2008-2012
Route 107 Corridor Study
Salem, Massachusetts



SYMBOL	ACCIDENT TYPE
MOVING VEHICLE	REAR END
BACKING VEHICLE	HEAD ON
PEDESTRIAN	SIDESWIPE
CW CROSSWALK	OUT OF CONTROL
PARKED VEHICLE	LEFT TURN
FIXED OBJECT	RIGHT ANGLE
INJURY ACCIDENT	

McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

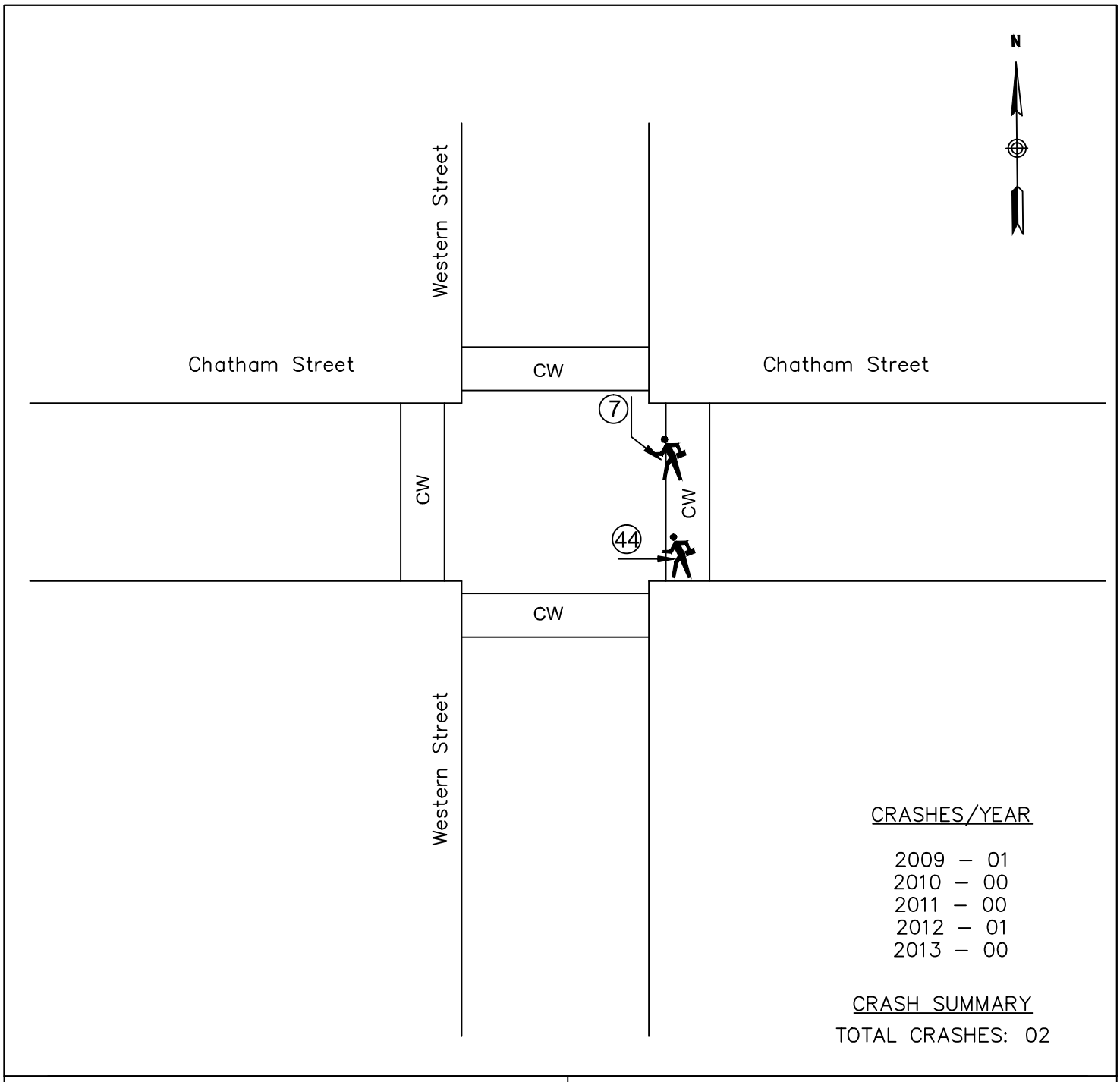
Highland Ave. at Marlborough Rd. / Traders Way
Crash Diagram 2008-2012
Route 107 Corridor Study
Salem, Massachusetts



SYMBOL	ACCIDENT TYPE
MOVING VEHICLE	REAR END
BACKING VEHICLE	HEAD ON
PEDESTRIAN	SIDESWIPE
CW CROSSWALK	OUT OF CONTROL
PARKED VEHICLE	LEFT TURN
FIXED OBJECT	RIGHT ANGLE
INJURY ACCIDENT	

McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

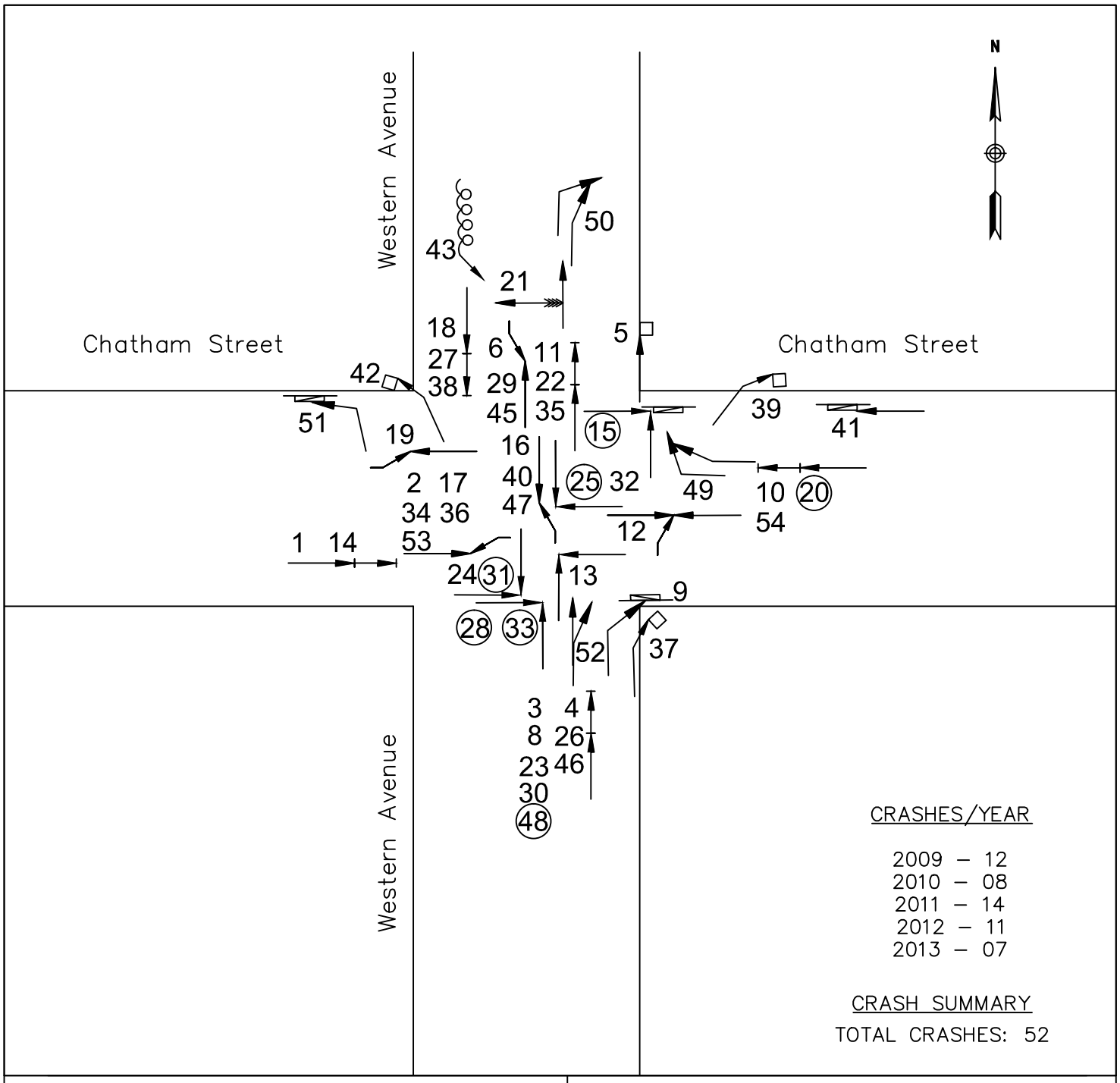
Western Avenue at Chatham Street
Crash Diagram 2009-2013
Route 107 Corridor Study
Lynn, Massachusetts



SYMBOL		ACCIDENT TYPE	
	MOVING VEHICLE		REAR END
	BICYCLE		HEAD ON
	PEDESTRIAN		SIDESWIPE
CW	CROSSWALK		OUT OF CONTROL
	MBTA BUS STOP		LEFT TURN
	INJURY ACCIDENT		RIGHT ANGLE

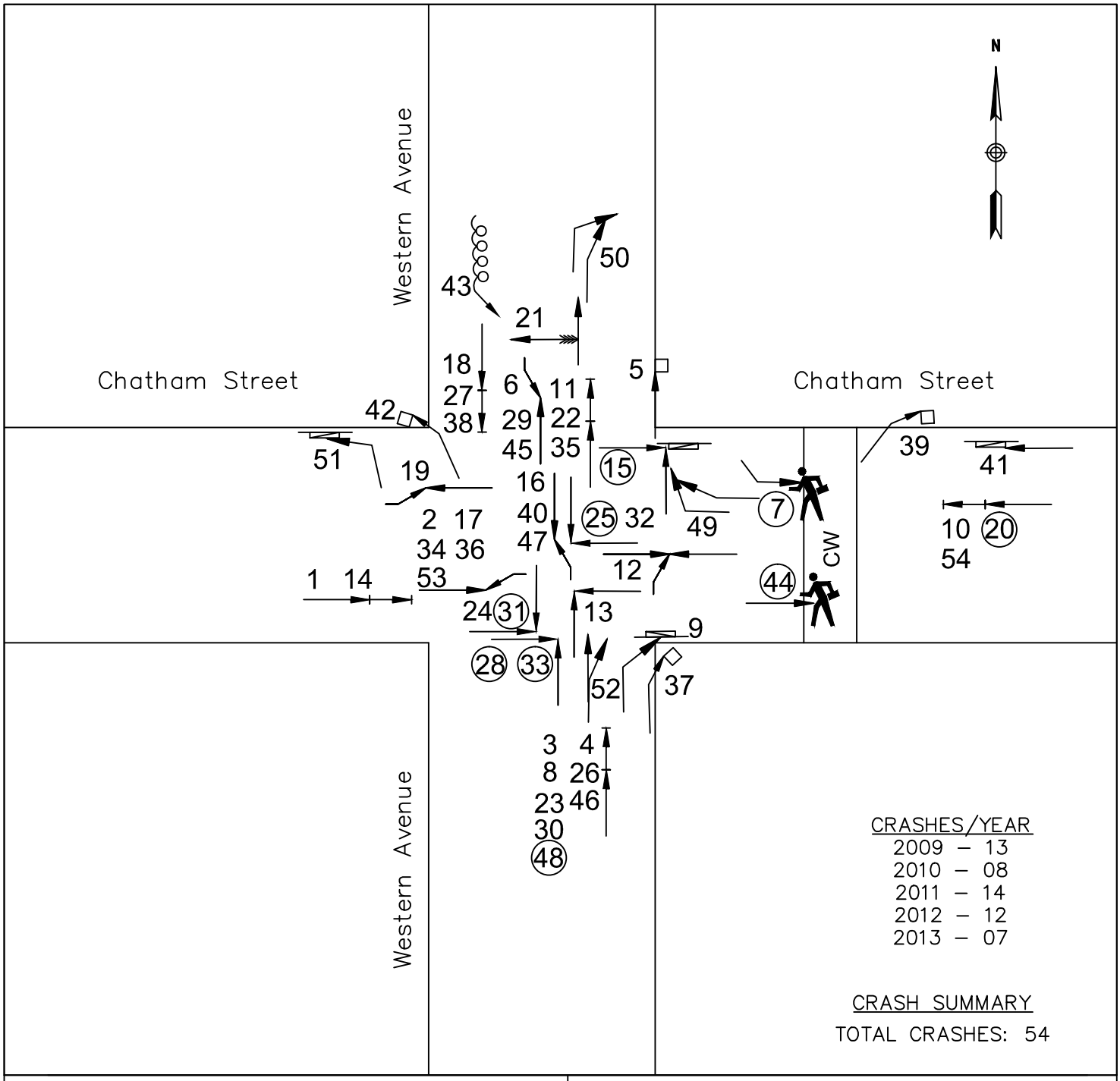
McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Western Avenue at Chatham Street
Crash Diagram 2009-2013
Route 107 Corridor Study
Lynn, Massachusetts



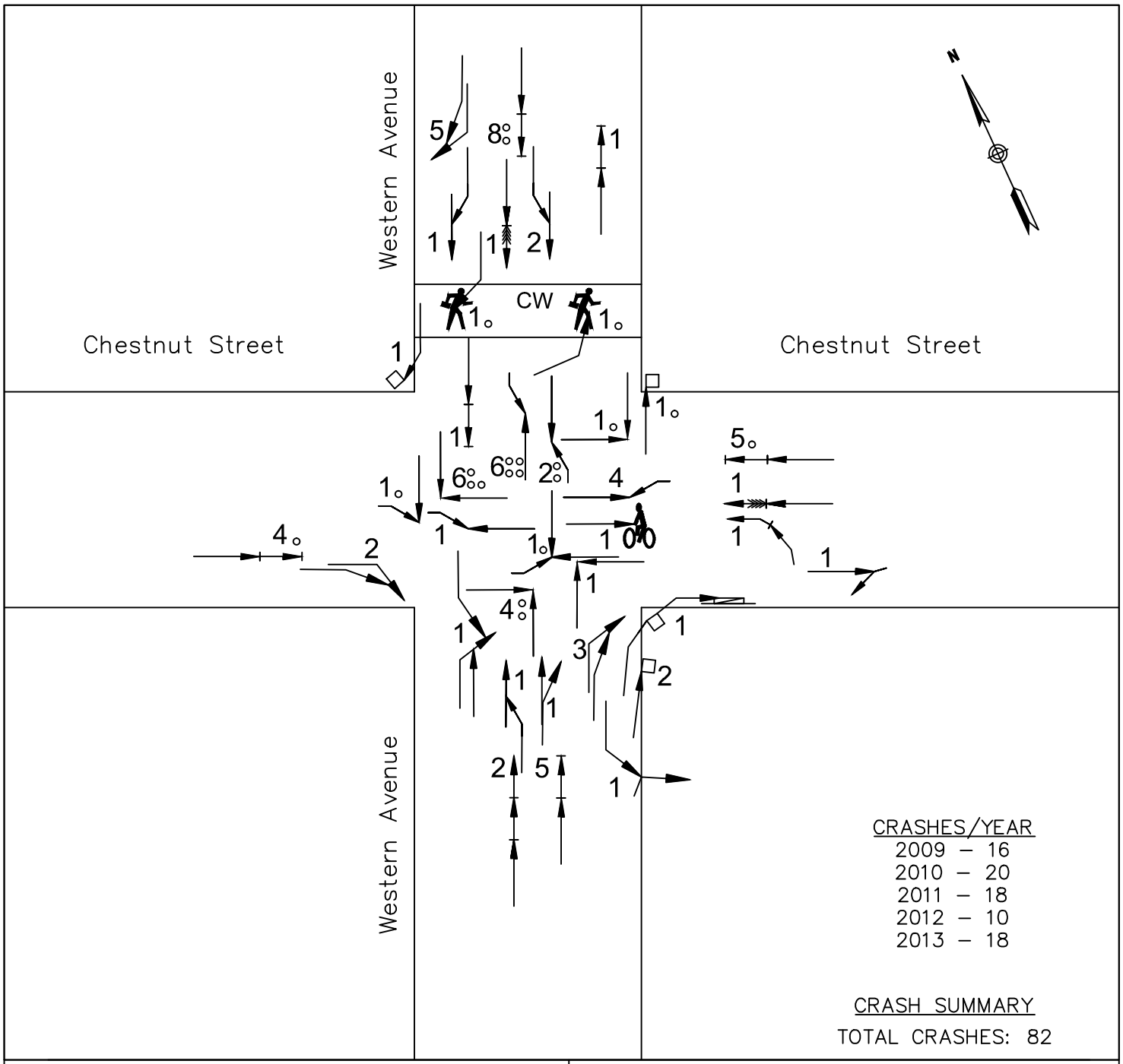
McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Western Avenue at Chatham Street
Crash Diagram 2009-2013
Route 107 Corridor Study
Lynn, Massachusetts



McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Western Avenue at Chatham Street
Crash Diagram 2009-2013
Route 107 Corridor Study
Lynn, Massachusetts



SYMBOL

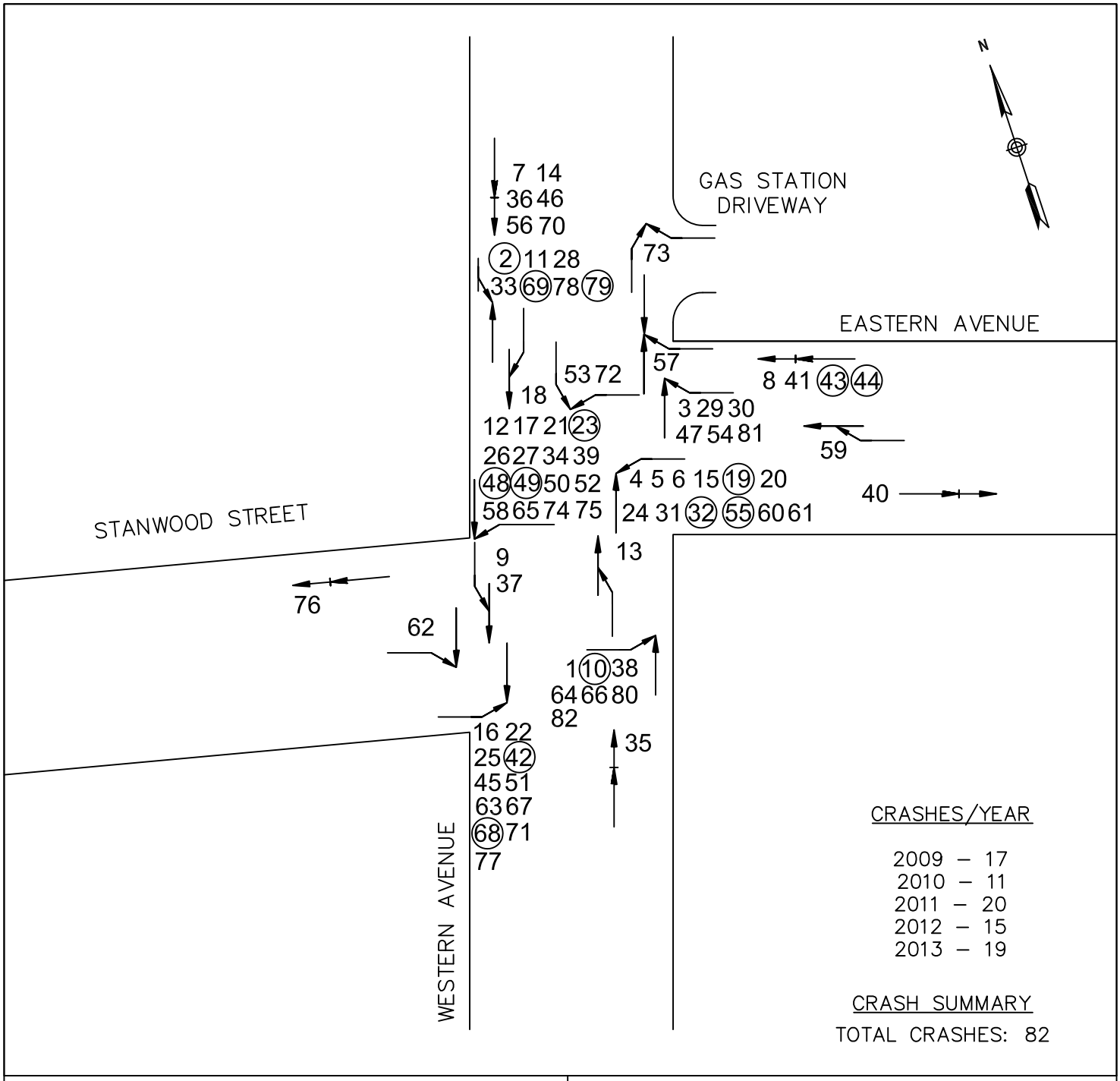
- MOVING VEHICLE
- BACKING VEHICLE
- PEDESTRIAN
- BICYCLIST
- CW — CROSSWALK
- PARKED VEHICLE
- FIXED OBJECT
- INJURY ACCIDENT

ACCIDENT TYPE

- REAR END
- HEAD ON
- SIDESWIPE
- OUT OF CONTROL
- LEFT TURN
- RIGHT ANGLE

McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

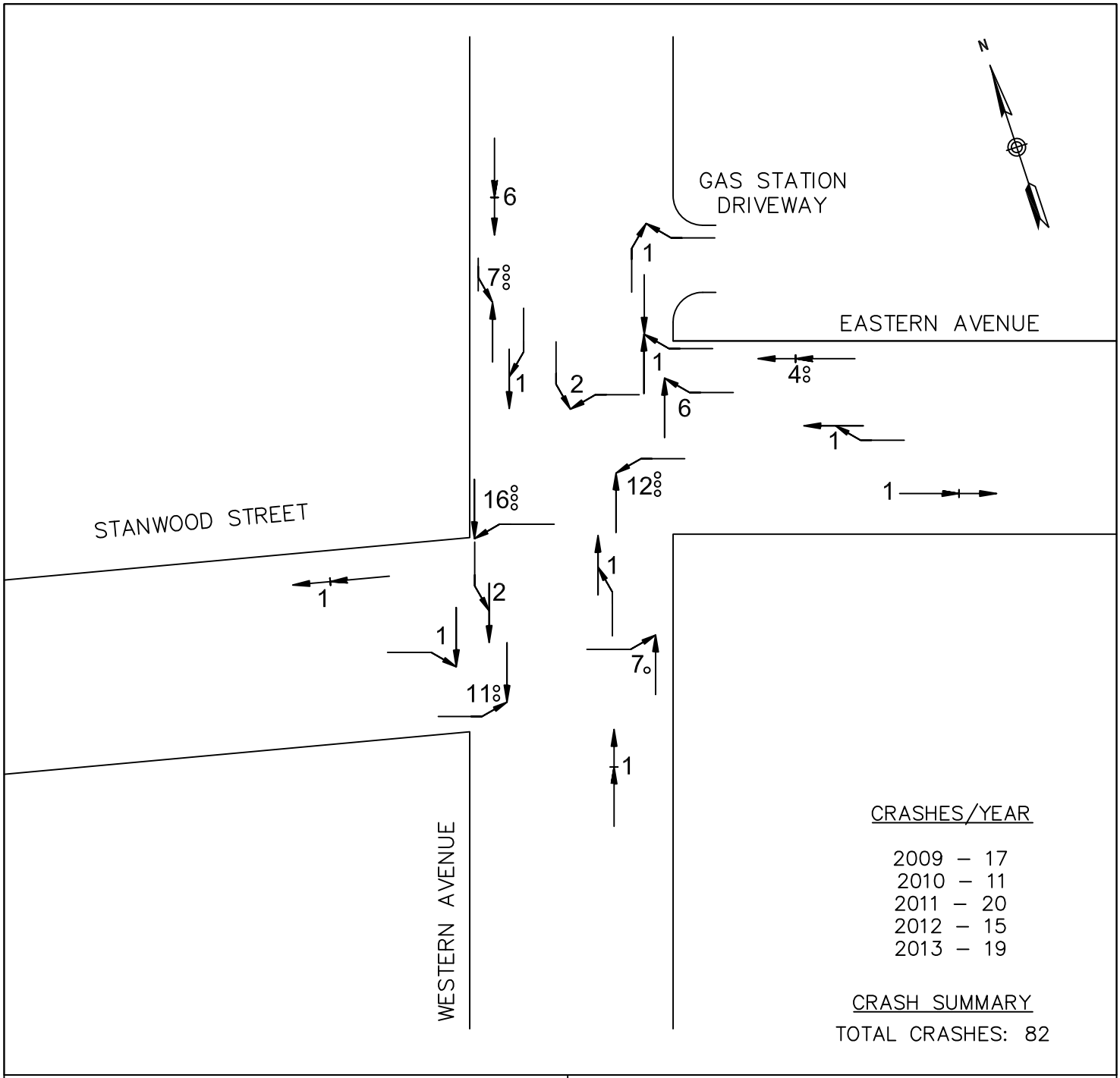
Western Avenue at Chestnut Street
Crash Diagram 2009-2013
Route 107 Corridor Study
Lynn, Massachusetts



SYMBOL	ACCIDENT TYPE
MOVING VEHICLE	REAR END
BACKING VEHICLE	HEAD ON
NON–INVOLVED VEHICLE	SIDESWIPE
PEDESTRIAN	OUT OF CONTROL
PARKED VEHICLE	LEFT TURN
FIXED OBJECT	RIGHT ANGLE
FATAL ACCIDENT	
INJURY ACCIDENT	

McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Eastern at Western Avenue
Crash Diagram 2009-2013
Route 107 Corridor Study
Lynn, Massachusetts



SYMBOL	ACCIDENT TYPE
MOVING VEHICLE	REAR END
BACKING VEHICLE	HEAD ON
NON–INVOLVED VEHICLE	SIDESWIPE
PEDESTRIAN	OUT OF CONTROL
PARKED VEHICLE	LEFT TURN
FIXED OBJECT	RIGHT ANGLE
FATAL ACCIDENT	
INJURY ACCIDENT	

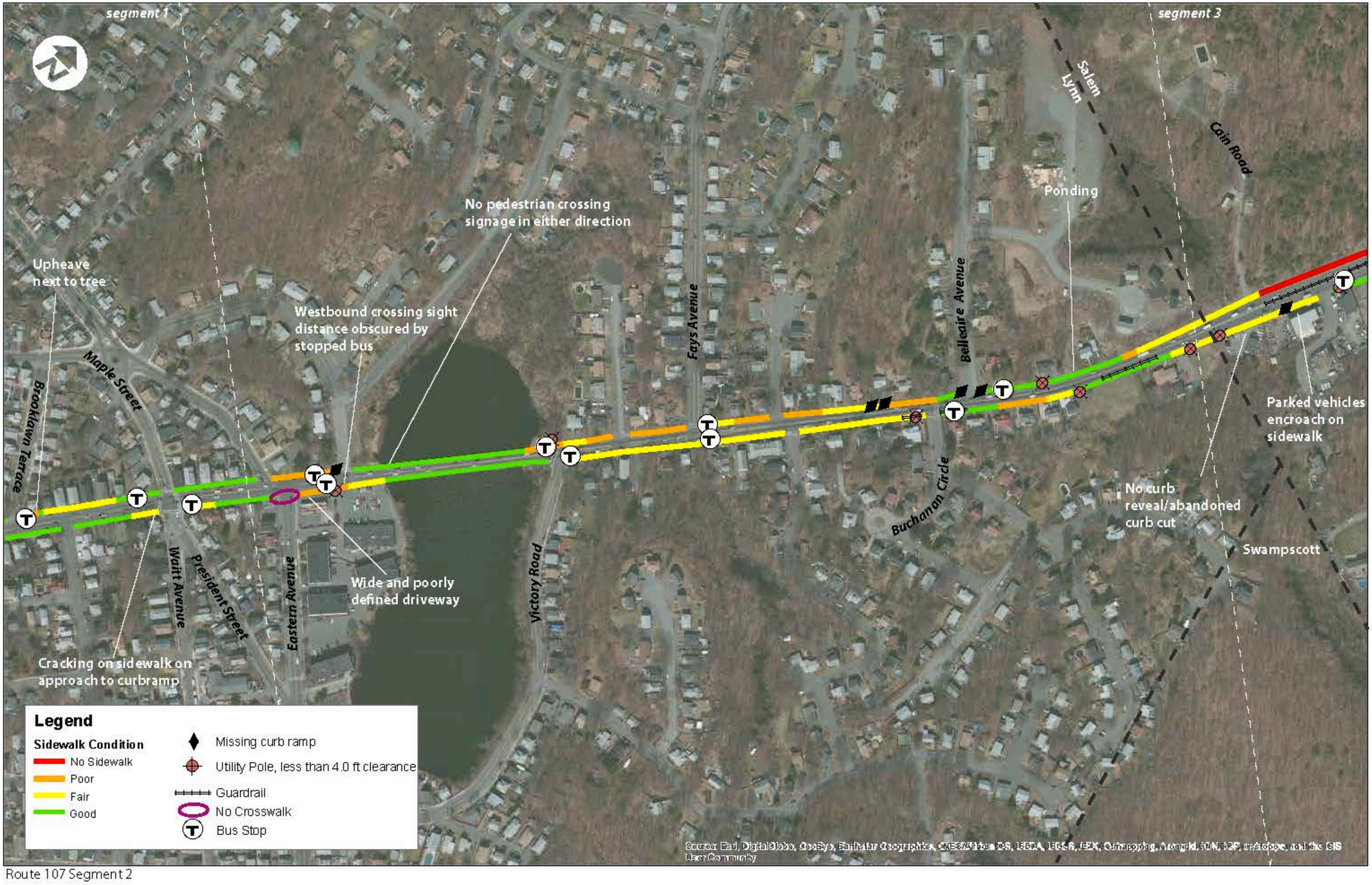
McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Eastern at Western Avenue
Crash Diagram 2009-2013
Route 107 Corridor Study
Lynn, Massachusetts

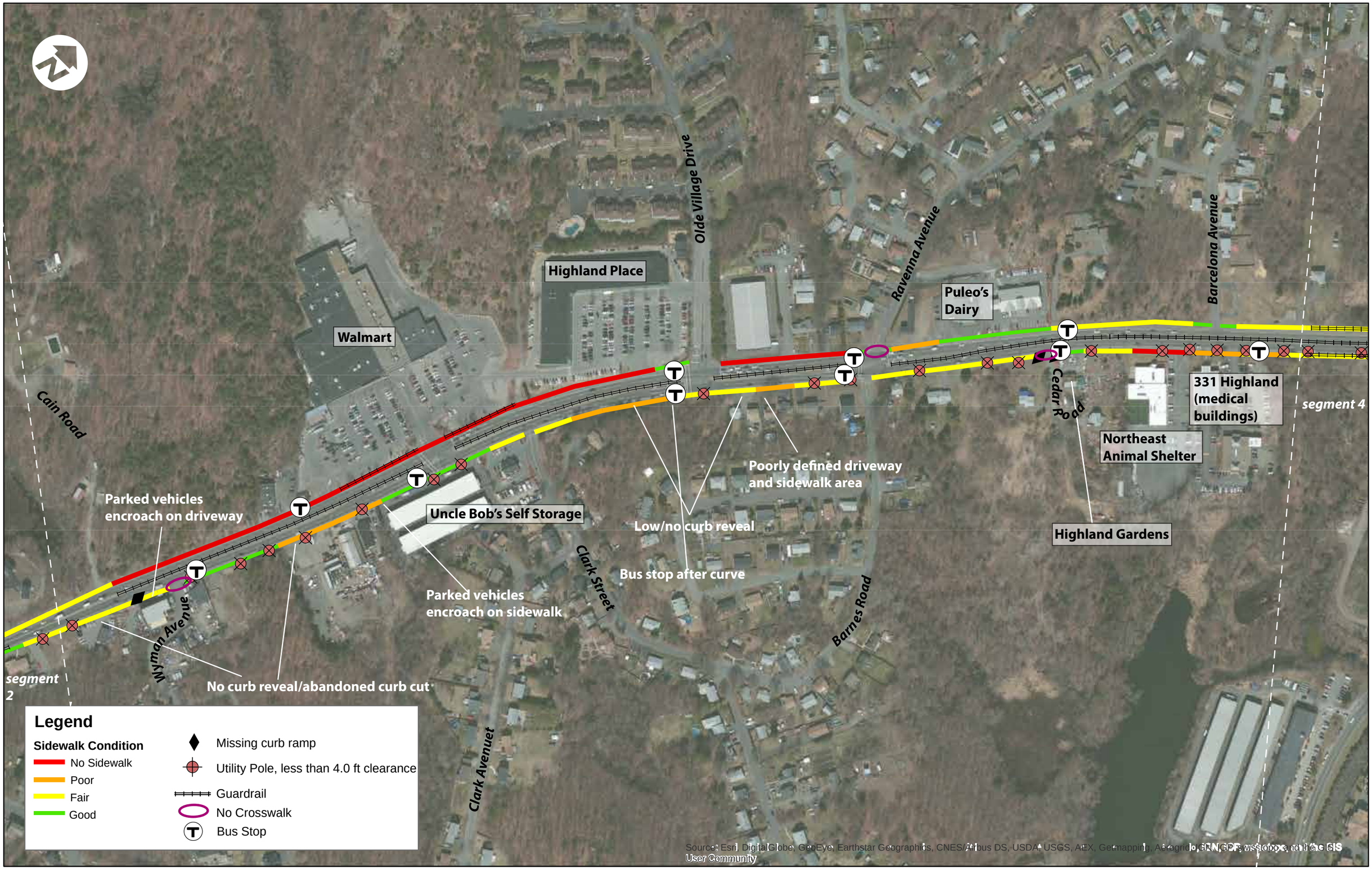
APPENDIX F

Sidewalk Deficiency Maps

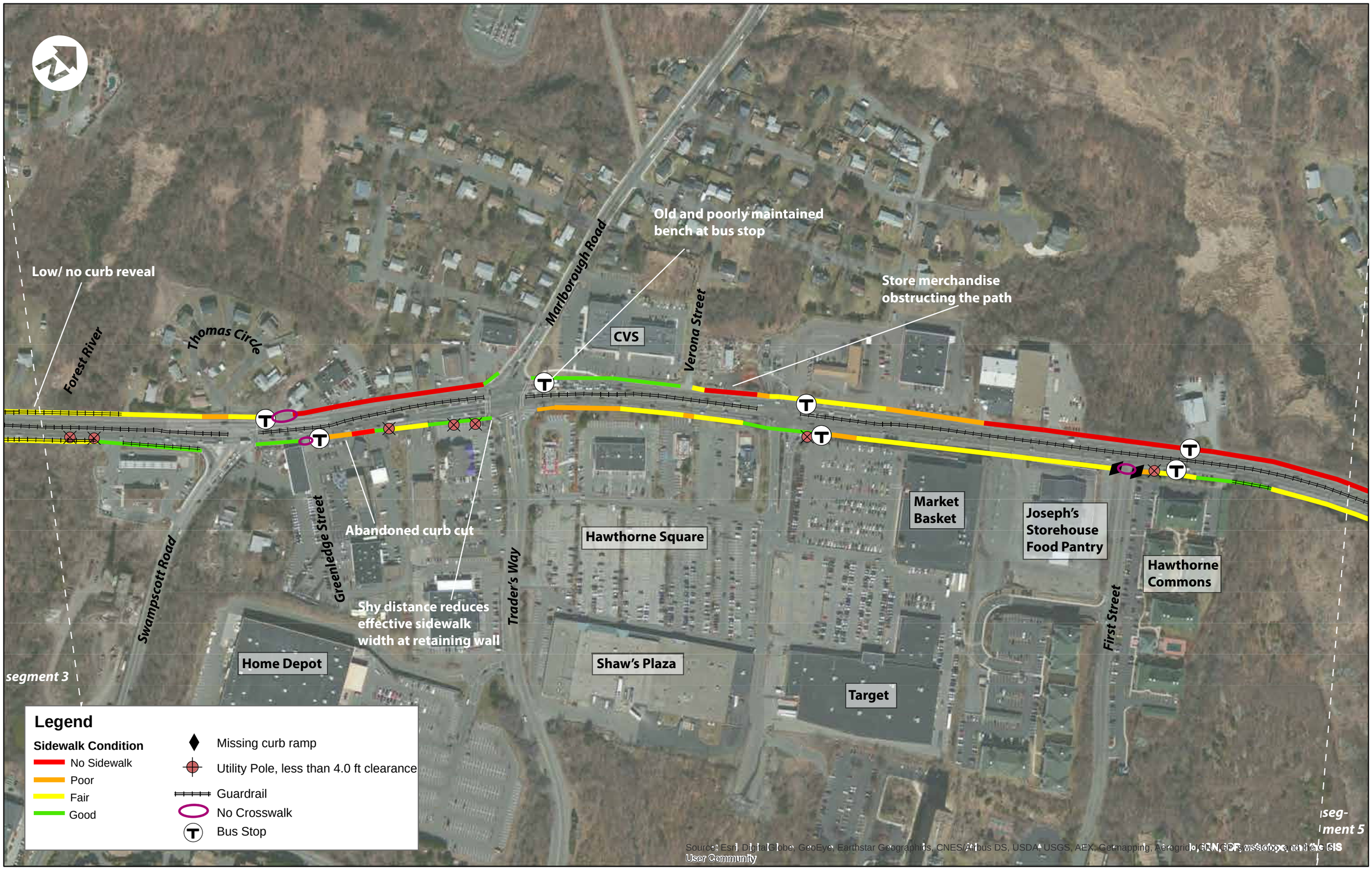
Route 107 Segment 1



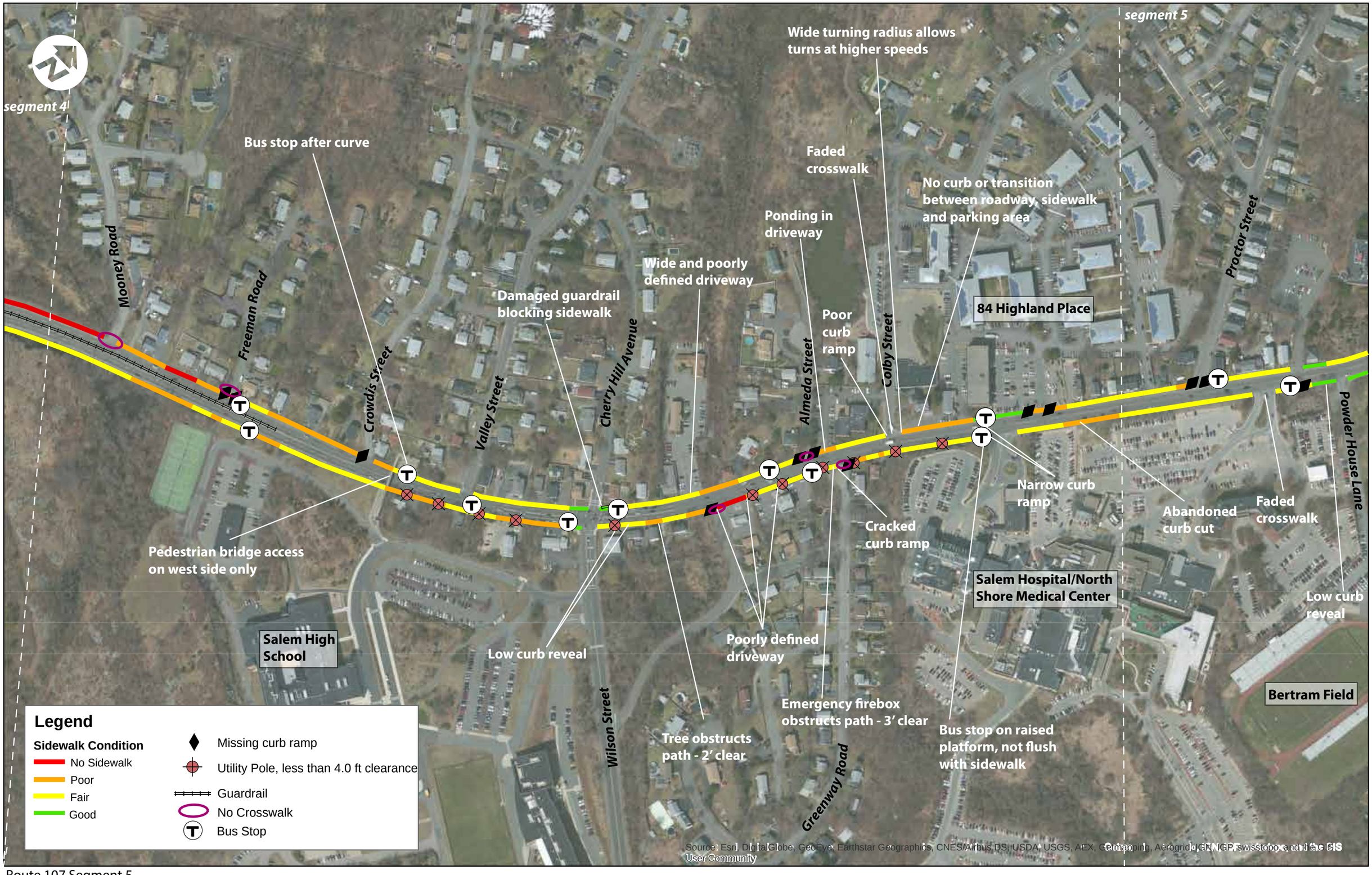
Route 107 Segment 2



Route 107 Segment 3



Route 107 Segment 4



Route 107 Segment 5

segment 5

Narrow curb ramp

Boston Street

Essex Street

Tree stump obstructs path - 4' clear

Fire Station

Proctor Street

6" sidewalk upheave next to tree

Dalton Parkway

Jackson Street

Poor curb ramp

Collins Middle School

Poor/cracked curb ramp

Faded crosswalk

Powder House Lane

Low curb reveal

Bertram Field

Legend

Sidewalk Condition

- No Sidewalk
- Poor
- Fair
- Good

- Missing curb ramp
- Utility Pole, less than 4.0 ft clearance
- Guardrail
- No Crosswalk
- Bus Stop

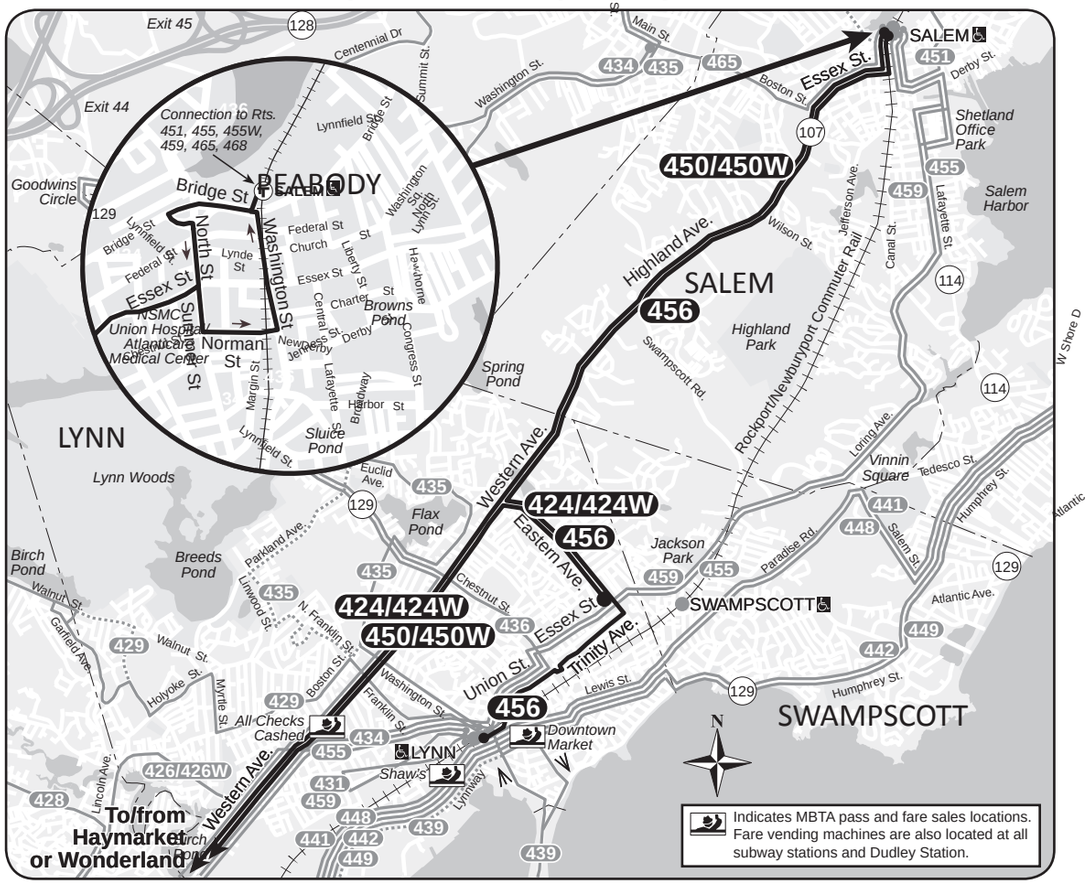
Route 107 Segment 6

APPENDIX G

Transit Information

Bus Route 424

Route 424/424W Eastern Ave/Essex St. - Haymarket or Wonderland
Route 450/450W Salem Depot - Haymarket or Wonderland
Route 456 Salem Depot - Central Square, Lynn



424/424W 450/450W•456

Fall September 3, 2016 - December 30, 2016

424/424W	**Eastern Ave. & Essex Street-Haymarket or Wonderland**
450/450W	**Salem Depot-Haymarket or Wonderland**
456	**Salem Depot-Central Sq. Lynn**

Serving

- Central Square, Lynn
- Salem Hospital
- North Shore Children's Hospital
- Bell Circle
- Eastern Avenue
- Essex Street
- Green Line
- Orange Line

Massachusetts Bay Transportation Authority massDOT Massachusetts Department of Transportation

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

424/424W/450/450W/456 Weekday

Route	Leave Salem Depot	Leave Eastern & Essex	Arrive Central Square	Arrive W.Lynn Garage	Arrive Wonder-land	Arrive Haymarket Station
424W	.....	5:51A	.....	6:08A	6:19A	.....
450	5:40	.....	.....	6:09	.....	6:30A
450	6:10	.....	.....	6:39	.....	7:00
424W	.....	6:31	.....	6:51	7:03	.....
450	6:40	.....	.....	7:11	.....	7:43
424W	.....	7:01	.....	7:22	7:37	.....
450	7:10	.....	.....	7:48	.....	8:20
424W	.....	7:31	.....	7:56	8:15	.....
450	7:40	.....	.....	8:18	.....	8:53
424W	.....	8:01	.....	8:19	8:37	.....
450	8:10	.....	.....	8:43	.....	9:17
450	8:40	.....	.....	9:09	.....	9:37
450	9:10	.....	.....	9:40	.....	10:01
450	10:20	.....	.....	10:56	.....	11:17
450	11:40	.....	.....	**12:18P**	**.....**	**12:39P**
450	**1:00**	**.....**	**.....**	**1:38P**	**.....**	**1:59P**
450	**2:20**	**.....**	**.....**	**3:02**	**.....**	**3:21**
450	**3:40**	**.....**	**.....**	**4:24**	**.....**	**4:43**
450	**4:50**	**.....**	**.....**	**5:34**	**.....**	**5:53**
450	**5:40**	**.....**	**.....**	**6:17**	**.....**	**6:40**
450	**6:10**	**.....**	**.....**	**6:40**	**.....**	**7:03**
450	**6:37**	**.....**	**.....**	**7:06**	**.....**	**.....**
450W	**7:01**	**.....**	**.....**	**7:29**	**7:44**	**.....**
450	**7:39**	**.....**	**.....**	**8:03**	**.....**	**.....**
450	**8:10**	**.....**	**.....**	**8:34**	**.....**	**8:58**
450	**9:10**	**.....**	**.....**	**9:35**	**.....**	**9:57**
450	**10:15**	**.....**	**.....**	**10:40**	**.....**	**11:02**
450	**11:15**	**.....**	**.....**	**11:36**	**.....**	**11:57**
450	12:12A	.....	.....	12:32A	.....	.....
450	1:10	.....	.....	1:30	.....	.....

Route	Leave Haymarket Station	Lv/Arrive W.Lynn Garage	Lv/Arrive Central Square	Arrive Salem Depot
450	.....	4:42A	.....	5:03A
450	.....	5:10	.....	5:29
450	.....	5:41	.....	6:00
450	.....	6:28	.....	7:03
450	6:40A	6:58	.....	7:36
450	7:10	7:28	.....	8:12
450	7:40	7:57	.....	8:36
450	8:10	8:27	.....	9:06
450	9:10	9:27	.....	10:06
450	10:20	10:38	.....	11:19
450	11:40	**12:01P**	**.....**	**12:42**
450	**1:00P**	**1:21P**	**.....**	**2:03**
450	**2:15**	**2:40**	**.....**	**3:29**
450	**3:10**	**3:35**	**.....**	**4:17**
450	**3:40**	**4:04**	**.....**	**4:49**
424	**b 4:00**	**4:26**	**.....**	**.....**
450	**4:25**	**4:53**	**.....**	**5:39**
424	**b 4:40**	**5:07**	**.....**	**.....**
450	**4:55**	**5:25**	**.....**	**6:11**
424	**b 5:10**	**5:46**	**.....**	**.....**
450	**5:25**	**5:56**	**.....**	**6:37**
424	**b 5:40**	**6:15**	**.....**	**.....**
450	**5:55**	**6:21**	**.....**	**7:00**
450	**6:10**	**6:35**	**.....**	**7:11**
450	**6:40**	**7:02**	**.....**	**7:33**
450	**7:10**	**7:29**	**.....**	**8:00**
450	**8:20**	**8:39**	**.....**	**9:10**
450	**9:20**	**9:39**	**.....**	**10:10**
450	**10:20**	**10:39**	**.....**	**11:10**
450	**11:30**	**11:49**	.....	12:20A

b - To Eastern Avenue & Essex Street

All buses are accessible to persons with disabilities

All Route 450 trips travel via the Callahan/Sumner Tunnel

450W Saturday

Leave Salem Depot	Arrive W. Lynn Garage	Arrive Wonderland Station	Leave Wonderland Station	Arrive W. Lynn Garage	Arrive Salem Depot
6:30A	6:53A	7:03A	.....	6:00A	6:25A
7:40	8:04	8:14	6:45A	6:54	7:20
8:50	9:18	9:28	.....	7:30	7:55
10:00	10:30	10:42	7:55	8:04	8:30
11:10	11:40	11:52	9:05	9:15	9:46
			10:15	10:25	11:02
12:25P	**12:58P**	**1:10P**	11:25	11:37	**12:15P**
1:35	**2:08**	**2:20**			
2:45	**3:18**	**3:30**	**12:35P**	**12:52P**	**1:31P**
3:55	**4:25**	**4:36**	**1:45**	**2:02**	**2:41**
5:05	**5:35**	**5:46**	**2:55**	**3:09**	**3:47**
6:15	**6:44**	**6:55**	**4:05**	**4:18**	**4:56**
7:25	**7:49**	**7:59**	**5:15**	**5:28**	**6:01**
8:30	**8:54**	**9:04**	**6:25**	**6:37**	**7:08**
9:30	**9:54**	**10:04**	**7:35**	**7:46**	**8:15**
10:32	**10:56**	**11:06**	**8:45**	**8:54**	**9:21**
11:32	**11:56**	12:06A	**9:45**	**9:54**	**10:21**
12:32A	12:48A	.....	**10:45**	**10:54**	**11:21**

450W Sunday

Leave Salem Depot	Arrive W. Lynn Garage	Arrive Wonderland Station	Leave Wonderland Station	Arrive W. Lynn Garage	Arrive Salem Depot
8:30A	8:55A	9:08A	7:45A	8:00A	8:23A
9:30	9:55	10:08	8:45	9:00	9:23
10:30	10:55	11:08	9:45	10:00	10:23
11:30	11:55	**12:08P**	10:45	11:00	11:23
			11:45	**12:00N**	**12:23P**
12:30P	**12:55P**	**1:08P**			
1:30	**1:55**	**2:08**	**12:45P**	**1:00P**	**1:23P**
2:30	**2:55**	**3:08**	**1:45**	**2:00**	**2:23**
3:30	**3:55**	**4:08**	**2:45**	**3:00**	**3:23**
4:30	**4:55**	**5:08**	**3:45**	**4:00**	**4:23**
5:30	**5:55**	**6:08**	**4:45**	**5:00**	**5:23**
6:30	**6:55**	**7:08**	**5:45**	**6:00**	**6:23**
7:30	**7:55**	**8:08**	**6:45**	**7:00**	**7:23**
8:30	**8:55**	**9:08**	**7:45**	**8:00**	**8:23**
9:30	**9:55**	**10:08**	**8:45**	**9:00**	**9:23**
10:30	**10:55**	**11:08**	**9:45**	**10:00**	**10:23**
11:50	12:15A	.....	**10:45**	**11:00**	**11:23**

Route 424/424W Eastern Avenue & Essex Street- Haymarket or Wonderland

Route 450/450W Salem Depot- Haymarket or Wonderland

Route 456 Salem Depot- Central Square, Lynn

Route 424/424W/450/450W Fares

Fare	Local Bus	Inner Express	Inner Express + Local Bus	Inner Express + Subway
CharlieCard	$1.70	$4.00	$4.00	$4.00
CharlieTicket	$2.00	$5.00	$7.00	$7.75
Cash-on-Board	$2.00	$5.00	$7.00	$7.75
Student*	$0.85	$2.50	$2.50	$2.50
Senior/TAP**	$0.85	$2.50	$2.50	$2.50

VALID PASSES: Inner Express Bus ($128/mo.), Outer Express Bus ($168/mo.), commuter rail, and boat passes.
FREE FARES: Children under 12 ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard, available to students through participating middle schools and high schools.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Local bus fare applies if your trip does not include Masspik

Local bus fare applies if your trip does not cross the Tobin Bridge or Boston Harbor

Route 456 Fares

Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.70	$1.70	$2.25	$2.25
CharlieTicket	$2.00	$2.00	$2.75	$4.75
Cash-on-Board	$2.00	$4.00	$2.75	$4.75
Student*	$0.85	$0.85	$1.10	$1.10
Senior/TAP**	$0.85	$0.85	$1.10	$1.10

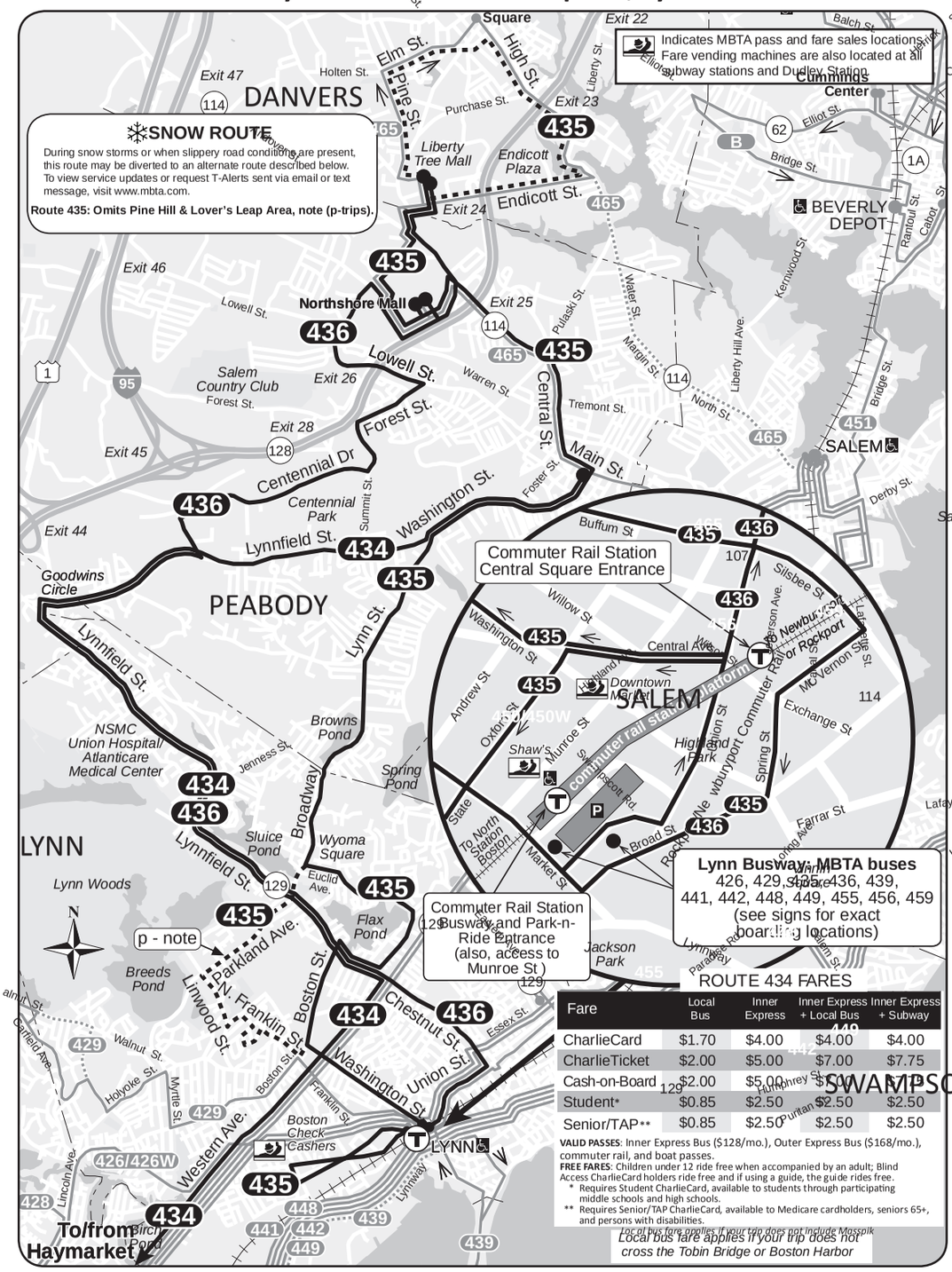
VALID PASSES: LinkPass ($84.50/mo.); Local Bus ($55/mo.); *Student LinkPass ($30.00/mo.); **Senior/TAP LinkPass ($30/mo.); and express bus, commuter rail, and boat passes.
FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard, available to students through participating middle schools and high schools.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Fall 2016 Holidays

October 10 & November 11: see Weekday
September 5, November 24 & December 26: see Sunday

Bus Route 434

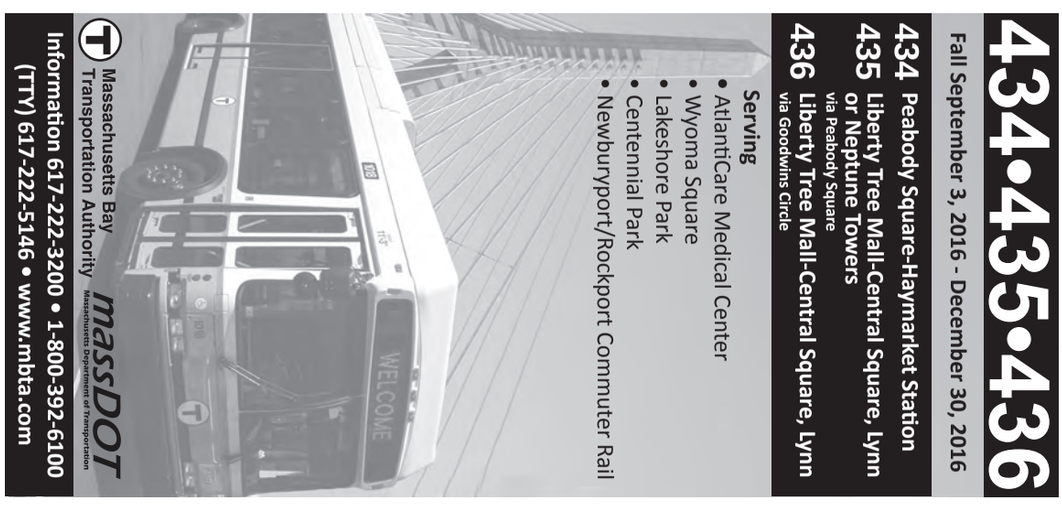
Route 434 Peabody Square - Haymarket Station
Route 435 Liberty Tree Mall - Central Square, Lynn or Neptune Towers via Peabody Sq.
Route 436 Liberty Tree Mall - Central Square, Lynn via Goodwins Cir.



ROUTE 434 FARES

Fare	Local Bus	Inner Express	Inner Express + Local Bus	Inner Express + Subway
CharlieCard	$1.70	$4.00	$4.00	$4.00
CharlieTicket	$2.00	$5.00	$7.00	$7.75
Cash-on-Board	$2.00	$5.00	$7.00	$7.75
Student*	$0.85	$2.50	$2.50	$2.50
Senior/TAP**	$0.85	$2.50	$2.50	$2.50

VALID PASSES: Inner Express Bus ($128/mo.), Outer Express Bus ($168/mo.), commuter rail, and boat passes.
FREE FARES: Children under 12 ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard, available to students through participating middle schools and high schools.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.
Local bus fare applies if your trip does not cross the Tobin Bridge or Boston Harbor



434•435•436

route/schedule change

Fall September 3, 2016 - December 30, 2016

434 Peabody Square-Haymarket Station
435 Liberty Tree Mall-Central Square, Lynn or Neptune Towers via Peabody Square
436 Liberty Tree Mall-Central Square, Lynn via Goodwins Circle

Serving
- AtlantiCare Medical Center
- Wyoma Square
- Lakeshore Park
- Centennial Park
- Newburyport/Rockport Commuter Rail

Massachusetts Bay Transportation Authority
massDOT Massachusetts Department of Transportation

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

434/435/436 Weekday

Route	Leave Liberty Tree Mall	Lv/Arrive N. Shore Mall	Leave Main St. Peabody	Arrive Centennial Park	Lv/Arrive Goodwins Circle	Arrive Central Square	Arrive Neptune Towers
436	.....	.....	.....	.....	6:40A	7:00A	7:05A
435	.....	.....	6:40A	.....	.....	7:05	.....
434	.....	.....	h 6:45	.....	6:58	.....	.....
435	.....	.....	p 7:15	.....	.....	7:43	.....
436	.....	7:00A	.....	7:13A	7:21	7:44	.....
436	.....	7:25	.....	7:38	7:46	8:09	.....
435	8:05A	8:14	8:23	.....	.....	8:48	8:53
436	.....	8:10	.....	8:23	8:31	8:50	.....
436	.....	8:40	.....	8:55	9:01	9:20	.....
436	.....	9:05	.....	9:20	9:26	9:45	.....
435	9:10	9:16	p 9:22	.....	.....	9:53	9:58
436	9:40	9:47	.....	10:03	10:09	10:33	.....
435	10:20	10:29	10:38	.....	.....	11:03	11:08
436	10:55	11:02	.....	11:16	11:22	11:47	.....
435	11:25	11:34	11:43	.....	.....	**12:08P**	**12:13P**
436	**12:05P**	**12:13P**	**.....**	**12:27P**	**12:33P**	**12:58P**	**.....**
435	**12:35**	**12:44**	**12:53P**	**.....**	**.....**	**1:18**	**1:23P**
436	**1:10**	**1:17**	**.....**	**1:31**	**1:39**	**2:04**	**.....**
435	**1:45**	**1:57**	**2:08**	**.....**	**.....**	**2:33**	**2:40**
436	**.....**	**.....**	**.....**	**.....**	**ms 2:35**	**2:43**	**.....**
436	**.....**	**.....**	**.....**	**.....**	**bs 2:45**	**3:04**	**.....**
436	**2:25**	**2:33**	**.....**	**2:48**	**2:56**	**3:24**	**.....**
435	**3:05**	**3:17**	**3:28**	**.....**	**.....**	**3:53**	**3:58**
436	**3:35**	**3:44**	**.....**	**4:00**	**4:08**	**4:34**	**.....**
435	**4:15**	**4:27**	**4:38**	**.....**	**.....**	**5:03**	**.....**
436	**4:45**	**4:54**	**.....**	**5:13**	**5:22**	**5:48**	**.....**
435	**5:10**	**5:22**	**5:33**	**.....**	**.....**	**5:58**	**.....**
436	**5:30**	**5:38**	**.....**	**5:57**	**6:03**	**6:26**	**.....**
436	**5:50**	**5:58**	**.....**	**6:13**	**6:18**	**6:41**	**.....**
435	**6:10**	**6:19**	**6:28**	**.....**	**.....**	**6:53**	**.....**
436	**6:40**	**6:48**	**.....**	**7:03**	**7:08**	**7:31**	**.....**
435	**7:50**	**8:01**	**8:06**	**.....**	**.....**	**8:33**	**.....**
435	**8:45**	**8:56**	**9:01**	**.....**	**.....**	**9:26**	**.....**
435	**9:45**	**9:57**	**10:01**	**.....**	**.....**	**10:26**	**.....**
435	**10:45**	**10:55**	**10:58**	**.....**	**.....**	**11:20**	**.....**

Route	Leave Neptune Towers	Leave Central Square	Arrive Goodwins Circle	Arrive Centennial Park	Arrive Main St. Peabody	Arrive N. Shore Mall	Arrive Liberty Tree Mall
435	.....	d 6:05A	.....	.....	6:27A	6:35A	6:44A
436	.....	6:10	6:30A	6:36A	.....	6:50	.....
436	.....	6:30	6:50	6:56	.....	7:11	.....
435	7:11A	7:13	.....	.....	7:45	7:56	8:01
436	.....	7:20	7:42	7:47	.....	8:02	.....
436	.....	7:50	8:14	8:19	.....	8:35	.....
435	.....	8:15	.....	.....	8:47	8:58	9:03
436	.....	8:20	8:39	8:44	.....	8:59	.....
436	.....	8:40	9:03	9:08	.....	9:25	9:32
435	9:17	9:19	.....	.....	9:51	10:02	10:12
436	.....	9:55	10:18	10:23	.....	10:39	10:46
435	10:27	10:30	.....	.....	10:55	11:06	11:16
436	.....	11:05	11:25	11:32	.....	11:48	11:55
435	11:37	11:40	.....	.....	**12:05P**	**12:16P**	**12:26P**
436	**.....**	**12:10P**	**12:30P**	**12:37P**	**.....**	**12:53P**	**1:00P**
435	**12:47P**	**12:50**	**.....**	**.....**	**1:16P**	**1:26**	**1:38**
436	**.....**	**1:25**	**1:46**	**1:51**	**.....**	**2:07**	**2:18**
435	**1:57**	**2:00**	**.....**	**.....**	**2:31**	**2:45**	**2:57**
436	**.....**	**2:30**	**3:00**	**3:06**	**.....**	**3:23**	**3:31**
436	**os 2:36**	**2:39**	**3:08**	**.....**	**.....**	**.....**	**.....**
435	**3:07**	**3:10**	**.....**	**.....**	**p 3:41**	**3:55**	**4:07**
436	**.....**	**3:40**	**4:05**	**4:10**	**.....**	**4:29**	**4:34**
435	**.....**	**4:05**	**.....**	**.....**	**4:35**	**4:47**	**4:58**
436	**.....**	**4:15**	**4:39**	**4:45**	**.....**	**5:05**	**5:13**
436	**.....**	**4:45**	**5:06**	**5:11**	**.....**	**5:29**	**5:38**
435	**.....**	**5:10**	**.....**	**.....**	**5:40**	**5:52**	**6:03**
436	**.....**	**5:40**	**6:01**	**6:06**	**.....**	**6:23**	**6:32**
435	**.....**	**5:45**	**.....**	**.....**	**p 6:10**	**.....**	**.....**
434	**.....**	**.....**	**g 6:18**	**.....**	**6:30**	**.....**	**.....**
436	**.....**	**6:10**	**6:31**	**.....**	**.....**	**.....**	**.....**
435	**.....**	**d 6:45**	**.....**	**.....**	**7:07**	**7:16**	**7:24**
436	**.....**	**7:15**	**7:36**	**.....**	**.....**	**.....**	**.....**
435	**.....**	**d 7:40**	**.....**	**.....**	**8:02**	**8:11**	**8:19**
435	**.....**	**d 8:40**	**.....**	**.....**	**8:59**	**9:07**	**9:15**
435	**.....**	**d 9:40**	**.....**	**.....**	**9:58**	**10:06**	**10:14**

b - Leaves from Broadway at Conomo Avenue to West Lynn Garage
c - To/from Central Square, Lynn ONLY
d - Continues to Danvers Square
g - Leaves from Haymarket Station at 5:20 PM.
h - To Haymarket Station, arrives at 8:00AM
m- Leaves from Goodridge Street at Memorial Park Avenue to West Lynn Garage
o - Continues to O'Callaghan Way & Osborne Street via Route 429
p - Via Pine Hill
s - Does NOT run during school vacation

Route 434
Peabody Square-Haymarket
EXPRESS

Please refer to map side of this card for fare information.

Route 434 Weekday Note: Service between Peabody Square and Haymarket Station via Goodwins Circle & Western Avenue departs Peabody at 6:45 AM. Departs Haymarket Station at 5:20 PM.

Fall 2016 Holidays

October 10 & November 11: see Weekday
September 5, November 24 & December 26: see Sunday

435/436 Saturday

Route	Leave Liberty Tree Mall	Arrive N. Shore Mall	Leave Main St. Peabody	Arrive Centennial Park	Lv/Arrive Goodwins Circle	Arrive Central Square	Arrive Neptune Towers
436	.....	.....	.....	.....	6:45A	7:02A	.....
436	.....	.....	.....	.....	8:25	8:42	.....
435	9:25A	9:38A	9:42A	.....	.....	10:12	10:17A
436	10:10	10:18	.....	10:29A	10:35	10:55	.....
435	10:35	10:48	10:52	.....	.....	11:22	11:27
436	11:20	11:32	.....	11:44	11:51	12:13P	.....
435	11:45	**12:03P**	**12:09P**	**.....**	**.....**	**12:42**	**12:47P**
436	**12:30P**	**12:42P**	**.....**	**12:54P**	**1:01P**	**1:25P**	**.....**
435	**12:55**	**1:13**	**1:19P**	**.....**	**.....**	**1:52**	**1:56P**
436	**1:40**	**1:53**	**.....**	**2:06**	**2:13**	**2:37**	**.....**
435	**2:05**	**2:20**	**2:26**	**.....**	**.....**	**2:58**	**3:02**
436	**2:50**	**3:03**	**.....**	**3:16**	**3:23**	**3:47**	**.....**
435	**3:15**	**3:32**	**3:39**	**.....**	**.....**	**4:12**	**4:16**
436	**4:00**	**4:13**	**.....**	**4:26**	**4:33**	**4:56**	**.....**
435	**4:25**	**4:42**	**4:49**	**.....**	**.....**	**5:22**	**5:26**
436	**5:10**	**5:24**	**.....**	**5:37**	**5:44**	**6:06**	**.....**
435	**5:35**	**5:52**	**5:59**	**.....**	**.....**	**6:32**	**.....**
436	**6:20**	**6:34**	**.....**	**6:47**	**6:54**	**7:16**	**.....**
435	**6:45**	**6:59**	**7:03**	**.....**	**.....**	**7:32**	**.....**
435	**7:30**	**7:44**	**7:48**	**.....**	**.....**	**8:16**	**.....**
435	**8:00**	**8:17**	**8:21**	**.....**	**.....**	**8:48**	**.....**
435	**9:00**	**9:17**	**9:21**	**.....**	**.....**	**9:48**	**.....**
435	**10:00**	**10:12**	**10:16**	**.....**	**.....**	**10:43**	**.....**
435	**11:00**	**11:12**	**11:16**	**.....**	**.....**	**11:43**	**.....**

Route	Leave Neptune Towers	Leave Central Square	Arrive Goodwins Circle	Arrive Centennial Park	Arrive Main St. Peabody	Arrive N. Shore Mall	Arrive Liberty Tree Mall
436	.....	6:20A	6:40A	.....	.....	.....	.....
436	.....	8:00	8:20	.....	.....	.....	.....
435	.....	8:30	.....	.....	8:54A	9:05A	9:15A
436	.....	9:00	9:19	9:24A	.....	9:37	9:44
435	.....	9:35	.....	.....	9:59	10:10	10:20
436	.....	10:10	10:29	10:35	.....	10:48	10:55
435	10:42A	10:45	.....	.....	11:11	11:24	11:34
436	.....	11:20	11:43	11:49	.....	**12:02P**	**12:10P**
435	11:52	11:55	.....	.....	**12:21P**	**12:34**	**12:44**
436	**.....**	**12:30P**	**12:53P**	**12:59P**	**.....**	**1:14P**	**1:22P**
435	**1:02P**	**1:05**	**.....**	**.....**	**1:33P**	**1:47**	**1:59**
436	**.....**	**1:40**	**2:03**	**2:09**	**.....**	**2:25**	**2:33**
435	**2:12**	**2:15**	**.....**	**.....**	**2:43**	**2:57**	**3:09**
436	**.....**	**2:50**	**3:14**	**3:20**	**.....**	**3:36**	**3:44**
435	**3:22**	**3:25**	**.....**	**.....**	**3:53**	**4:06**	**4:17**
436	**.....**	**4:00**	**4:21**	**4:27**	**.....**	**4:43**	**4:51**
435	**4:32**	**4:35**	**.....**	**.....**	**5:00**	**5:13**	**5:24**
436	**.....**	**5:10**	**5:31**	**5:37**	**.....**	**5:53**	**6:01**
435	**5:42**	**5:45**	**.....**	**.....**	**6:08**	**6:19**	**6:29**
435	**.....**	**6:20**	**.....**	**.....**	**6:42**	**6:53**	**7:02**
435	**.....**	**7:00**	**.....**	**.....**	**7:21**	**7:32**	**7:41**
435	**.....**	**8:00**	**.....**	**.....**	**8:20**	**8:29**	**8:39**
435	**.....**	**9:00**	**.....**	**.....**	**9:20**	**9:29**	**9:39**
435	**.....**	**10:00**	**.....**	**.....**	**10:20**	**10:29**	**10:39**

435 Sunday

Route	Leave Liberty Tree Mall	Arrive N. Shore Mall	Leave Main St. Peabody	Arrive Central Square	Arrive Neptune Towers
435	11:00A	11:09A	11:18A	11:43A	11:46A
435	**12:50P**	**12:59P**	**1:08P**	**1:33P**	**1:36P**
435	**2:40**	**2:49**	**2:58**	**3:23**	**3:26**
435	**4:30**	**4:39**	**4:48**	**5:13**	**5:16**
435	**6:20**	**6:29**	**6:38**	**7:03**	**.....**
435	**7:00**	**7:09**	**7:18**	**7:43**	**.....**
435	**7:40**	**7:49**	**7:58**	**8:23**	**.....**

Route	Leave Neptune Towers	Leave Central Square	Arrive Main St. Peabody	Arrive N. Shore Mall	Arrive Liberty Tree Mall
435	.....	9:30A	9:55A	10:03A	10:12A
435	10:07A	10:10	10:35	10:43	10:52
435	11:57	**12:00N**	**12:25P**	**12:33P**	**12:42P**
435	**1:47P**	**1:50P**	**2:15P**	**2:23P**	**2:32P**
435	**3:37**	**3:40**	**4:05**	**4:13**	**4:22**
435	**5:27**	**5:30**	**5:55**	**6:03**	**6:12**
435	**.....**	**6:10**	**6:35**	**6:43**	**6:52**

Route 435
Liberty Tree Mall-
Central Square, Lynn or
Neptune Towers
via Peabody Sq.

Route 436
Liberty Tree Mall-
Central Square, Lynn
via Goodwins Circle

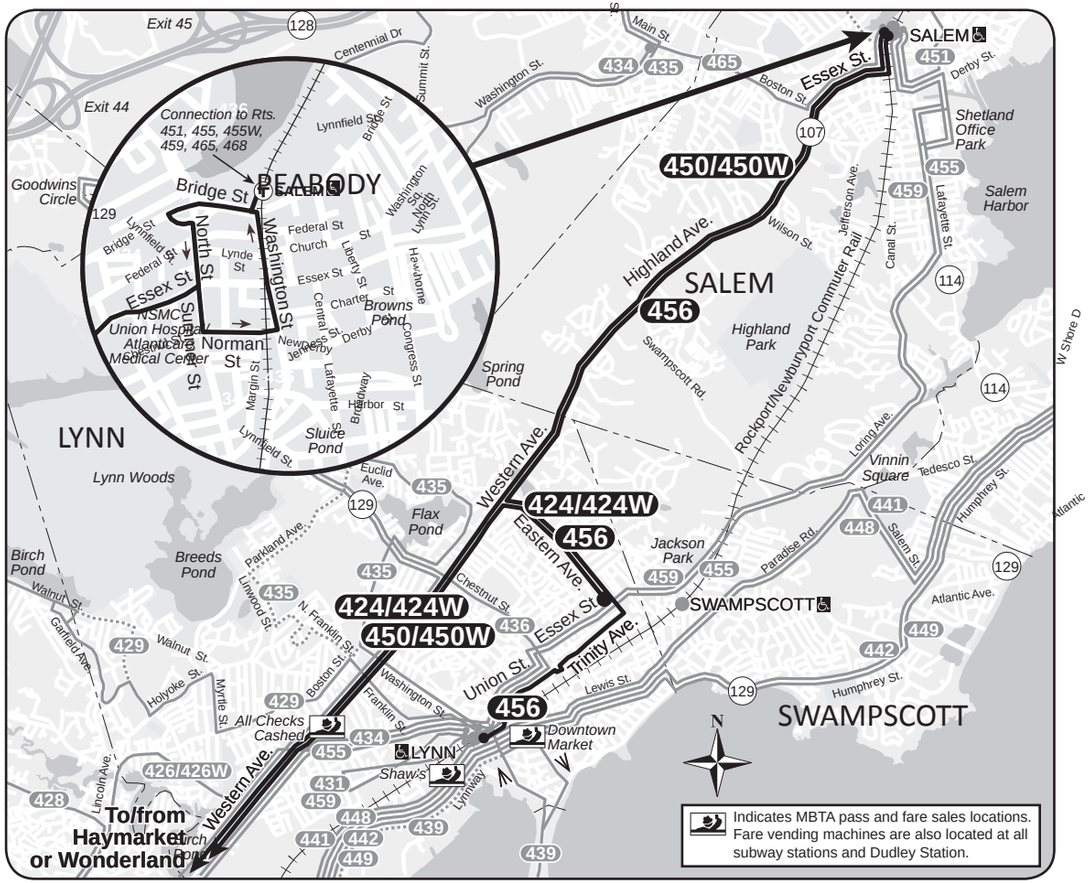
Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.70	$1.70	$2.25	$2.25
CharlieTicket	$2.00	$2.00	$2.75	$4.75
Cash-on-Board	$2.00	$4.00	$2.75	$4.75
Student*	$0.85	$0.85	$1.10	$1.10
Senior/TAP**	$0.85	$0.85	$1.10	$1.10

All buses are accessible to persons with disabilities

VALID PASSES: LinkPass ($84.50/mo.); Local Bus ($55/mo.); *Student LinkPass ($30.00/mo.); **Senior/TAP LinkPass ($30/mo.); and express bus, commuter rail, and boat passes.
FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard, available to students through participating middle schools and high schools.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Bus Route 450

Route 424/424W Eastern Ave/Essex St. - Haymarket or Wonderland
Route 450/450W Salem Depot - Haymarket or Wonderland
Route 456 Salem Depot - Central Square, Lynn



424/424W 450/450W•456

Fall September 3, 2016 - December 30, 2016

424/424W	**Eastern Ave. & Essex Street-Haymarket or Wonderland**
450/450W	**Salem Depot-Haymarket or Wonderland**
456	**Salem Depot-Central Sq. Lynn**

Serving

- Central Square, Lynn
- Salem Hospital
- North Shore Children's Hospital
- Bell Circle
- Eastern Avenue
- Essex Street
- Green Line
- Orange Line

Massachusetts Bay Transportation Authority massDOT Massachusetts Department of Transportation

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

424/424W/450/450W/456 Weekday

Route	Leave Salem Depot	Leave Eastern & Essex	Arrive Central Square	Arrive W.Lynn Garage	Arrive Wonder-land	Arrive Haymarket Station
424W	.....	5:51A	.....	6:08A	6:19A	.....
450	5:40	.....	.....	6:09	.....	6:30A
450	6:10	.....	.....	6:39	.....	7:00
424W	.....	6:31	.....	6:51	7:03	.....
450	6:40	.....	.....	7:11	.....	7:43
424W	.....	7:01	.....	7:22	7:37	.....
450	7:10	.....	.....	7:48	.....	8:20
424W	.....	7:31	.....	7:56	8:15	.....
450	7:40	.....	.....	8:18	.....	8:53
424W	.....	8:01	.....	8:19	8:37	.....
450	8:10	.....	.....	8:43	.....	9:17
450	8:40	.....	.....	9:09	.....	9:37
450	9:10	.....	.....	9:40	.....	10:01
450	10:20	.....	.....	10:56	.....	11:17
450	11:40	.....	.....	**12:18P**	**.....**	**12:39P**
450	**1:00**	**.....**	**.....**	**1:38P**	**.....**	**1:59P**
450	**2:20**	**.....**	**.....**	**3:02**	**.....**	**3:21**
450	**3:40**	**.....**	**.....**	**4:24**	**.....**	**4:43**
450	**4:50**	**.....**	**.....**	**5:34**	**.....**	**5:53**
450	**5:40**	**.....**	**.....**	**6:17**	**.....**	**6:40**
450	**6:10**	**.....**	**.....**	**6:40**	**.....**	**7:03**
450	**6:37**	**.....**	**.....**	**7:06**	**.....**	**.....**
450W	**7:01**	**.....**	**.....**	**7:29**	**7:44**	**.....**
450	**7:39**	**.....**	**.....**	**8:03**	**.....**	**.....**
450	**8:10**	**.....**	**.....**	**8:34**	**.....**	**8:58**
450	**9:10**	**.....**	**.....**	**9:35**	**.....**	**9:57**
450	**10:15**	**.....**	**.....**	**10:40**	**.....**	**11:02**
450	**11:15**	**.....**	**.....**	**11:36**	**.....**	**11:57**
450	12:12A	.....	.....	12:32A	.....	.....
450	1:10	.....	.....	1:30	.....	.....

Route	Leave Haymarket Station	Lv/Arrive W.Lynn Garage	Lv/Arrive Central Square	Arrive Salem Depot
450	.....	4:42A	.....	5:03A
450	.....	5:10	.....	5:29
450	.....	5:41	.....	6:00
450	.....	6:28	.....	7:03
450	6:40A	6:58	.....	7:36
450	7:10	7:28	.....	8:12
450	7:40	7:57	.....	8:36
450	8:10	8:27	.....	9:06
450	9:10	9:27	.....	10:06
450	10:20	10:38	.....	11:19
450	11:40	**12:01P**	**.....**	**12:42**
450	**1:00P**	**1:21P**	**.....**	**2:03**
450	**2:15**	**2:40**	**.....**	**3:29**
450	**3:10**	**3:35**	**.....**	**4:17**
450	**3:40**	**4:04**	**.....**	**4:49**
424	**b 4:00**	**4:26**	**.....**	**.....**
450	**4:25**	**4:53**	**.....**	**5:39**
424	**b 4:40**	**5:07**	**.....**	**.....**
450	**4:55**	**5:25**	**.....**	**6:11**
424	**b 5:10**	**5:46**	**.....**	**.....**
450	**5:25**	**5:56**	**.....**	**6:37**
424	**b 5:40**	**6:15**	**.....**	**.....**
450	**5:55**	**6:21**	**.....**	**7:00**
450	**6:10**	**6:35**	**.....**	**7:11**
450	**6:40**	**7:02**	**.....**	**7:33**
450	**7:10**	**7:29**	**.....**	**8:00**
450	**8:20**	**8:39**	**.....**	**9:10**
450	**9:20**	**9:39**	**.....**	**10:10**
450	**10:20**	**10:39**	**.....**	**11:10**
450	**11:30**	**11:49**	.....	12:20A

b - To Eastern Avenue & Essex Street

All buses are accessible to persons with disabilities

All Route 450 trips travel via the Callahan/Sumner Tunnel

450W Saturday

Leave Salem Depot	Arrive W. Lynn Garage	Arrive Wonderland Station	Leave Wonderland Station	Arrive W. Lynn Garage	Arrive Salem Depot
6:30A	6:53A	7:03A	.....	6:00A	6:25A
7:40	8:04	8:14	6:45A	6:54	7:20
8:50	9:18	9:28	.....	7:30	7:55
10:00	10:30	10:42	7:55	8:04	8:30
11:10	11:40	11:52	9:05	9:15	9:46
			10:15	10:25	11:02
12:25P	**12:58P**	**1:10P**	11:25	11:37	**12:15P**
1:35	**2:08**	**2:20**			
2:45	**3:18**	**3:30**	**12:35P**	**12:52P**	**1:31P**
3:55	**4:25**	**4:36**	**1:45**	**2:02**	**2:41**
5:05	**5:35**	**5:46**	**2:55**	**3:09**	**3:47**
6:15	**6:44**	**6:55**	**4:05**	**4:18**	**4:56**
7:25	**7:49**	**7:59**	**5:15**	**5:28**	**6:01**
8:30	**8:54**	**9:04**	**6:25**	**6:37**	**7:08**
9:30	**9:54**	**10:04**	**7:35**	**7:46**	**8:15**
10:32	**10:56**	**11:06**	**8:45**	**8:54**	**9:21**
11:32	**11:56**	12:06A	**9:45**	**9:54**	**10:21**
12:32A	12:48A	.....	**10:45**	**10:54**	**11:21**

450W Sunday

Leave Salem Depot	Arrive W. Lynn Garage	Arrive Wonderland Station	Leave Wonderland Station	Arrive W. Lynn Garage	Arrive Salem Depot
8:30A	8:55A	9:08A	7:45A	8:00A	8:23A
9:30	9:55	10:08	8:45	9:00	9:23
10:30	10:55	11:08	9:45	10:00	10:23
11:30	11:55	**12:08P**	10:45	11:00	11:23
			11:45	**12:00N**	**12:23P**
12:30P	**12:55P**	**1:08P**			
1:30	**1:55**	**2:08**	**12:45P**	**1:00P**	**1:23P**
2:30	**2:55**	**3:08**	**1:45**	**2:00**	**2:23**
3:30	**3:55**	**4:08**	**2:45**	**3:00**	**3:23**
4:30	**4:55**	**5:08**	**3:45**	**4:00**	**4:23**
5:30	**5:55**	**6:08**	**4:45**	**5:00**	**5:23**
6:30	**6:55**	**7:08**	**5:45**	**6:00**	**6:23**
7:30	**7:55**	**8:08**	**6:45**	**7:00**	**7:23**
8:30	**8:55**	**9:08**	**7:45**	**8:00**	**8:23**
9:30	**9:55**	**10:08**	**8:45**	**9:00**	**9:23**
10:30	**10:55**	**11:08**	**9:45**	**10:00**	**10:23**
11:50	12:15A	.....	**10:45**	**11:00**	**11:23**

Route 424/424W Eastern Avenue & Essex Street- Haymarket or Wonderland

Route 450/450W Salem Depot- Haymarket or Wonderland

Route 456 Salem Depot- Central Square, Lynn

Route 424/424W/450/450W Fares

Fare	Local Bus	Inner Express	Inner Express + Local Bus	Inner Express + Subway
CharlieCard	$1.70	$4.00	$4.00	$4.00
CharlieTicket	$2.00	$5.00	$7.00	$7.75
Cash-on-Board	$2.00	$5.00	$7.00	$7.75
Student*	$0.85	$2.50	$2.50	$2.50
Senior/TAP**	$0.85	$2.50	$2.50	$2.50

VALID PASSES: Inner Express Bus ($128/mo.), Outer Express Bus ($168/mo.), commuter rail, and boat passes.
FREE FARES: Children under 12 ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard, available to students through participating middle schools and high schools.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Local bus fare applies if your trip does not include Masspik

Local bus fare applies if your trip does not cross the Tobin Bridge or Boston Harbor

Route 456 Fares

Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.70	$1.70	$2.25	$2.25
CharlieTicket	$2.00	$2.00	$2.75	$4.75
Cash-on-Board	$2.00	$4.00	$2.75	$4.75
Student*	$0.85	$0.85	$1.10	$1.10
Senior/TAP**	$0.85	$0.85	$1.10	$1.10

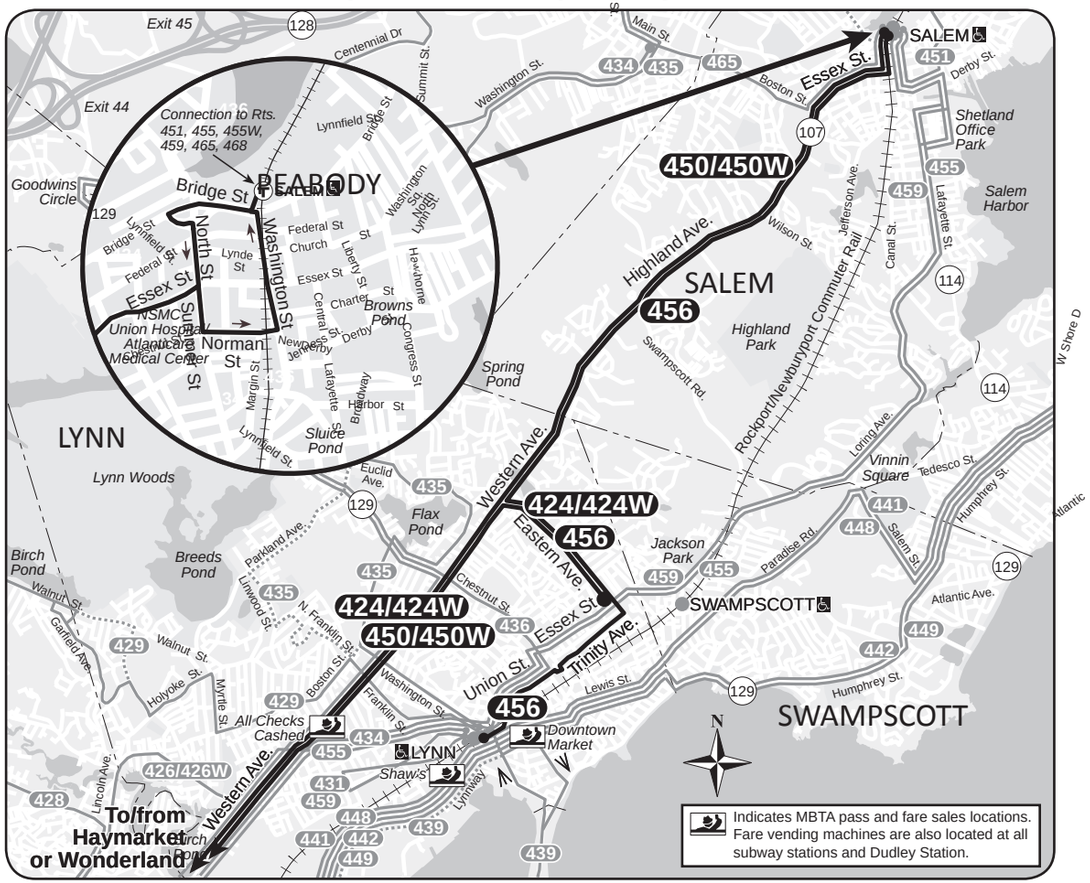
VALID PASSES: LinkPass ($84.50/mo.); Local Bus ($55/mo.); *Student LinkPass ($30.00/mo.); **Senior/TAP LinkPass ($30/mo.); and express bus, commuter rail, and boat passes.
FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard, available to students through participating middle schools and high schools.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Fall 2016 Holidays

October 10 & November 11: see Weekday
September 5, November 24 & December 26: see Sunday

Bus Route 456

Route 424/424W Eastern Ave/Essex St. - Haymarket or Wonderland
Route 450/450W Salem Depot - Haymarket or Wonderland
Route 456 Salem Depot - Central Square, Lynn



424/424W 450/450W•456

Fall September 3, 2016 - December 30, 2016

424/424W	**Eastern Ave. & Essex Street-Haymarket or Wonderland**
450/450W	**Salem Depot-Haymarket or Wonderland**
456	**Salem Depot-Central Sq. Lynn**

Serving

- Central Square, Lynn
- Salem Hospital
- North Shore Children's Hospital
- Bell Circle
- Eastern Avenue
- Essex Street
- Green Line
- Orange Line

Massachusetts Bay Transportation Authority massDOT Massachusetts Department of Transportation

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424/424W/450/450W/456 Weekday

Route	Leave Salem Depot	Leave Eastern & Essex	Arrive Central Square	Arrive W.Lynn Garage	Arrive Wonder-land	Arrive Haymarket Station
424W	.....	5:51A	.....	6:08A	6:19A	.....
450	5:40	.....	.....	6:09	.....	6:30A
450	6:10	.....	.....	6:39	.....	7:00
424W	.....	6:31	.....	6:51	7:03	.....
450	6:40	.....	.....	7:11	.....	7:43
424W	.....	7:01	.....	7:22	7:37	.....
450	7:10	.....	.....	7:48	.....	8:20
424W	.....	7:31	.....	7:56	8:15	.....
450	7:40	.....	.....	8:18	.....	8:53
424W	.....	8:01	.....	8:19	8:37	.....
450	8:10	.....	.....	8:43	.....	9:17
450	8:40	.....	.....	9:09	.....	9:37
450	9:10	.....	.....	9:40	.....	10:01
456	9:40	9:59	10:08	.....	.....	.....
450	10:20	.....	.....	10:56	.....	11:17
456	11:00	11:19	11:29	.....	.....	.....
450	11:40	.....	.....	**12:18P**	**.....**	**12:39P**
456	**12:20P**	**12:39P**	**12:49P**	**.....**	**.....**	**.....**
450	**1:00**	**.....**	**.....**	**1:38P**	**.....**	**1:59P**
456	**1:40**	**2:01**	**2:11**	**.....**	**.....**	**.....**
450	**2:20**	**.....**	**.....**	**3:02**	**.....**	**3:21**
456	**3:00**	**3:24**	**3:32**	**.....**	**.....**	**.....**
450	**3:40**	**.....**	**.....**	**4:24**	**.....**	**4:43**
456	**4:20**	**4:44**	**4:52**	**.....**	**.....**	**.....**
450	**4:50**	**.....**	**.....**	**5:34**	**.....**	**5:53**
450	**5:40**	**.....**	**.....**	**6:17**	**.....**	**6:40**
450	**6:10**	**.....**	**.....**	**6:40**	**.....**	**7:03**
450	**6:37**	**.....**	**.....**	**7:06**	**.....**	**.....**
450W	**7:01**	**.....**	**.....**	**7:29**	**7:44**	**.....**
450	**7:39**	**.....**	**.....**	**8:03**	**.....**	**.....**
450	**8:10**	**.....**	**.....**	**8:34**	**.....**	**8:58**
450	**9:10**	**.....**	**.....**	**9:35**	**.....**	**9:57**
450	**10:15**	**.....**	**.....**	**10:40**	**.....**	**11:02**
450	**11:15**	**.....**	**.....**	**11:36**	**.....**	**11:57**
450	12:12A	.....	.....	12:32A	.....	.....
450	1:10	.....	.....	1:30	.....	.....

Route	Leave Haymarket Station	Lv/Arrive W.Lynn Garage	Lv/Arrive Central Square	Arrive Salem Depot
450	.....	4:42A	.....	5:03A
450	.....	5:10	.....	5:29
450	.....	5:41	.....	6:00
450	.....	6:28	.....	7:03
456	.....	6:52	7:00A	7:34
450	6:40A	6:58	.....	7:36
450	7:10	7:28	.....	8:12
450	7:40	7:57	.....	8:36
450	8:10	8:27	.....	9:06
456	.....	8:30	8:40	9:15
456	.....	.....	9:00	9:30
450	9:10	9:27	.....	10:06
456	.....	.....	10:15	10:48
450	10:20	10:38	.....	11:19
456	.....	.....	11:35	**12:05P**
450	11:40	**12:01P**	**.....**	**12:42**
456	**.....**	**.....**	**12:55P**	**1:30P**
450	**1:00P**	**1:21P**	**.....**	**2:03**
456	**.....**	**.....**	**2:15**	**2:58**
450	**2:15**	**2:40**	**.....**	**3:29**
456	**.....**	**.....**	**3:35**	**4:11**
450	**3:10**	**3:35**	**.....**	**4:17**
450	**3:40**	**4:04**	**.....**	**4:49**
424	**b 4:00**	**4:26**	**.....**	**.....**
450	**4:25**	**4:53**	**.....**	**5:39**
424	**b 4:40**	**5:07**	**.....**	**.....**
450	**4:55**	**5:25**	**.....**	**6:11**
424	**b 5:10**	**5:46**	**.....**	**.....**
450	**5:25**	**5:56**	**.....**	**6:37**
424	**b 5:40**	**6:15**	**.....**	**.....**
450	**5:55**	**6:21**	**.....**	**7:00**
450	**6:10**	**6:35**	**.....**	**7:11**
450	**6:40**	**7:02**	**.....**	**7:33**
450	**7:10**	**7:29**	**.....**	**8:00**
450	**8:20**	**8:39**	**.....**	**9:10**
450	**9:20**	**9:39**	**.....**	**10:10**
450	**10:20**	**10:39**	**.....**	**11:10**
450	**11:30**	**11:49**	.....	12:20A

Route 456 indicated by shaded areas

All buses are accessible to persons with disabilities

b - To Eastern Avenue & Essex Street

All Route 450 trips travel via the Callahan/Sumner Tunnel

450W Saturday

Leave Salem Depot	Arrive W. Lynn Garage	Arrive Wonderland Station	Leave Wonderland Station	Arrive W. Lynn Garage	Arrive Salem Depot
6:30A	6:53A	7:03A	.....	6:00A	6:25A
7:40	8:04	8:14	6:45A	6:54	7:20
8:50	9:18	9:28	.....	7:30	7:55
10:00	10:30	10:42	7:55	8:04	8:30
11:10	11:40	11:52	9:05	9:15	9:46
			10:15	10:25	11:02
12:25P	**12:58P**	**1:10P**	11:25	11:37	**12:15P**
1:35	**2:08**	**2:20**			
2:45	**3:18**	**3:30**	**12:35P**	**12:52P**	**1:31P**
3:55	**4:25**	**4:36**	**1:45**	**2:02**	**2:41**
5:05	**5:35**	**5:46**	**2:55**	**3:09**	**3:47**
6:15	**6:44**	**6:55**	**4:05**	**4:18**	**4:56**
7:25	**7:49**	**7:59**	**5:15**	**5:28**	**6:01**
8:30	**8:54**	**9:04**	**6:25**	**6:37**	**7:08**
9:30	**9:54**	**10:04**	**7:35**	**7:46**	**8:15**
10:32	**10:56**	**11:06**	**8:45**	**8:54**	**9:21**
11:32	**11:56**	12:06A	**9:45**	**9:54**	**10:21**
12:32A	12:48A	.....	**10:45**	**10:54**	**11:21**

450W Sunday

Leave Salem Depot	Arrive W. Lynn Garage	Arrive Wonderland Station	Leave Wonderland Station	Arrive W. Lynn Garage	Arrive Salem Depot
8:30A	8:55A	9:08A	7:45A	8:00A	8:23A
9:30	9:55	10:08	8:45	9:00	9:23
10:30	10:55	11:08	9:45	10:00	10:23
11:30	11:55	**12:08P**	10:45	11:00	11:23
			11:45	**12:00N**	**12:23P**
12:30P	**12:55P**	**1:08P**			
1:30	**1:55**	**2:08**	**12:45P**	**1:00P**	**1:23P**
2:30	**2:55**	**3:08**	**1:45**	**2:00**	**2:23**
3:30	**3:55**	**4:08**	**2:45**	**3:00**	**3:23**
4:30	**4:55**	**5:08**	**3:45**	**4:00**	**4:23**
5:30	**5:55**	**6:08**	**4:45**	**5:00**	**5:23**
6:30	**6:55**	**7:08**	**5:45**	**6:00**	**6:23**
7:30	**7:55**	**8:08**	**6:45**	**7:00**	**7:23**
8:30	**8:55**	**9:08**	**7:45**	**8:00**	**8:23**
9:30	**9:55**	**10:08**	**8:45**	**9:00**	**9:23**
10:30	**10:55**	**11:08**	**9:45**	**10:00**	**10:23**
11:50	12:15A	.....	**10:45**	**11:00**	**11:23**

Route 424/424W Eastern Avenue & Essex Street- Haymarket or Wonderland

Route 450/450W Salem Depot- Haymarket or Wonderland

Route 456 Salem Depot- Central Square, Lynn

Route 424/424W/450/450W Fares

Fare	Local Bus	Inner Express	Inner Express + Local Bus	Inner Express + Subway
CharlieCard	$1.70	$4.00	$4.00	$4.00
CharlieTicket	$2.00	$5.00	$7.00	$7.75
Cash-on-Board	$2.00	$5.00	$7.00	$7.75
Student*	$0.85	$2.50	$2.50	$2.50
Senior/TAP**	$0.85	$2.50	$2.50	$2.50

VALID PASSES: Inner Express Bus ($128/mo.), Outer Express Bus ($168/mo.), commuter rail, and boat passes.
FREE FARES: Children under 12 ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard, available to students through participating middle schools and high schools.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Local bus fare applies if your trip does not include Masspik

Local bus fare applies if your trip does not cross the Tobin Bridge or Boston Harbor

Route 456 Fares

Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.70	$1.70	$2.25	$2.25
CharlieTicket	$2.00	$2.00	$2.75	$4.75
Cash-on-Board	$2.00	$4.00	$2.75	$4.75
Student*	$0.85	$0.85	$1.10	$1.10
Senior/TAP**	$0.85	$0.85	$1.10	$1.10

VALID PASSES: LinkPass ($84.50/mo.); Local Bus ($55/mo.); *Student LinkPass ($30.00/mo.); **Senior/TAP LinkPass ($30/mo.); and express bus, commuter rail, and boat passes.
FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard, available to students through participating middle schools and high schools.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Fall 2016 Holidays

October 10 & November 11: see Weekday
September 5, November 24 & December 26: see Sunday

Bus Stop Consolidation Analysis

Stop Seq	Stop ID	INBOUND STOPS	Route Direction	Distance to next stop (ft)	Revised distance to next stop (ft)	On (FA14)	Off (FA14)	Stop pairs opposite/ close by?	Proposed Recommendation
1	4458	ESSEX ST OPP WARREN ST	IB	1,292	1160+F2:F25	46	3	Y	Retain stop due to presence of shelter and good sidewalk conditions. ALT: Ideally relocate shelter to recessed area and shift stop north and closer to crosswalk and pedestrian path through adjacent property.
2	4459	HIGHLAND AVE @ PROCTOR ST	IB	687	800	11	6	Y	Retain nearside of Procter, farside of proposed crosswalk.
3	14460	HIGHLAND AVE OPP SALEM HOSPITAL	IB	654	1,100	74	11	Y	Retain stop but shift slightly north, closer to the crosswalk, to improve left turn movements from the hospital driveway. Add bench or shelter.
4	4461	HIGHLAND AVE @ ALMEDA ST	IB	458	-	3	2	Y	Eliminate stop due to low ridership, absence of crosswalk and to improve stop spacing.
5	4462	HIGHLAND AVE @ CHERRY HILL AV	IB	630	620	4	1	Y	Retain stop due to the proximity to the schools. Consider shifting south slightly closer to Cherry Hill Ave, if sight distance is not an issue.
6	4463	HIGHLAND AVE @ VALLEY ST	IB	546	1,650	12	1	Y	Retain stop close to the pedestrian bridge and add a crosswalk for connections to the eastside of Route 107.
7	4464	HIGHLAND AVE @ FREEMAN RD	IB	1,119	-	1	0	Y	Eliminate stop due to low ridership, absence of crosswalk, poor sidewalk conditions and proximity to previous stop
8	14464	HIGHLAND AVE OPP FIRST ST	IB	1,125	1,170	5	1	Y	Retain stop due to the presence of Hawthorne Commons apartments on First St, and distance to closest stop, but only in conjunction with the addition of a crosswalk and creation of a connecting sidewalk to/from and at the bus stop. If a crosswalk is not feasible, stop should probably be eliminated to discourage crossing Route 107.
9	14465	HIGHLAND AVE OPP HAWTHORNE SQ	IB	775	770	99	65	Y	Retain stop nearside, due to absence of sidewalk at the farside of the intersection. Bus will continue to stop in right turn lane.
10	4465	HIGHLAND AVE @ MARLBOROUGH RD	IB	824	830	48	20	N	Temporarily retain stop nearside, due to absence of sidewalk at the farside of the intersection. Bus will continue to stop in right turn lane. Long-term. Relocate farside in conjunction with access management improvements and the addition of a sidewalk. Relocation of stop out of the right turn lane will improve traffic operations, and eliminate the conflict crossing the proposed bike lane. New location stopping in the bike and travel lanes will impact traffic operations with the proposed lane barrier; however because of the low frequency of bus service the delay will be minimal.
11	4467	HIGHLAND AVE @ THOMAS CIRCLE	IB	1,460	1,960	4	5	Y	Temporarily retain stop due to the absence of a sidewalk, between Thomas Circle and Marlborough Rd, on the westside of Route 107. Relocate front sign to improve visibility and widen sidewalk to provide LA. Also add crosswalk across Route 107 for connections to Swampscott Road. Long-term. Eliminate stop, due to low ridership, the relocation of Marlborough Rd stop, in conjunction with sidewalk improvements on the westside of Route 107.
12	14468	HIGHLAND AVE OPP CEDAR RD	IB	647	-	1	1	Y	Eliminate stop due to low ridership, proximity to next stop and absence of crosswalk (closest is at next stop). Addition of a crosswalk is anticipated to be complicated due to the existing roadway alignment and grade, in addition to the speed limit.
13	4469	HIGHLAND AVE @ RAVENNA AVE	IB	541	690	5	2	Y	Temporarily relocate stop to nearside of intersection to existing sidewalk. Existing location has no sidewalk and there are a number of pinch points due to utility poles. Long-term - Retain stop farside in conjunction with sidewalk, crosswalk and intersection improvements.
14	4470	HIGHLAND AVE @ RICHS PLAZA	IB	1,169	830	19	4	Y	Retain stop. Create LA by removing grass strip.
15	14470	HIGHLAND AVE @ WALMART	IB	1,478	1,960	37	18	Y	Relocate stop north to farside of crosswalk in conjunction with construction of sidewalk and pedestrian connections to Walmart internal pathway (no existing sidewalk in this area). Add bench or shelter.
16	4472	WESTERN AVE OPP BUCHANAN CIRC	IB	891	640	1	2	Y	Relocate stop about ~270' south to farside of crosswalk to improve pedestrian crossing and safety, and add curb ramps. Rename stop @ Belleaire Ave.
17	4473	WESTERN AVE @ FAYS AVE	IB	491	1,700	8	5	Y	Temporarily retain stop nearside. Relocate front sign from ped signal to post. Long-term. Relocate stop farside in conjunction with sidewalk, crosswalk and intersection improvements.
18	4474	WESTERN AVE OPP VICTORY RD	IB	697	-	1	2	Y	Eliminate stop due to low ridership, proximity to previous stop and pond, very narrow sidewalk, poorly maintained and absence of curb ramps at the adjacent crosswalk.
19	4475	WESTERN AVE OPP EASTERN AVE	IB	535	-	27	16	Y	Eliminate stop due to proximity to next stop & pond, very poor sidewalk conditions, and absence of curb ramp at crosswalk.
20	4477	WESTERN AVE @ MAPLE ST	IB	351	1,300	24	4	Y	Retain stop farside. Relocate front sign = -<1 parking space. Add rear sign. If Route 424 is re-routed because of banned left from Eastern onto Western, lengthen stop to the south to allow both bus doors to pull to the curb.
21	4478	WESTERN AVE @ BROOKLAWN TERR	IB	850	-	4	1	N	Eliminate stop to improve spacing, low ridership, absence of crosswalk, grass strip at LA & ~200' from its stop pair. No rear sign but nearest driveway is ~2 parking spaces length away.
22	4479	WESTERN AVE @ CHATHAM ST	IB	605	820	28	14	Y	Relocate further north ~200' to farside of Ryans Terr (outside appliance store) -3 unreg parking spaces.
23	4480	WESTERN AVE OPP TRACY AVE	IB	354	-	8	3	Y	Eliminate stop to improve spacing, low ridership, and absence of crosswalk. No rear sign but stop between driveways =~ 1 parking space long.
24	4481	WESTERN AVE @ CROSS ST	IB	795	800	11	2	Y	Retain stop nearside. Relocate rear sign = -2 parking spaces. Add curb ramp at crosswalk in front of stop.
25	4482	WESTERN AVE @ CHESTNUT ST	IB	-	-	42	18	Y	Retain stop nearside. Add bench in coordination with abutting property owner. Eliminate next stop at Rockingham (if exists) and relocate opp Rockingham (@ Lucia Lighting) to be farside of the crosswalk, instead of the LA in the curb ramp (-2 striped parking spaces). Also, retain Chestnut EB & relocate front sign closer to intersection to improve proximity to the crosswalk and bus connections on Western Ave. A consolidation to Western Ave would require maintaining existing stop, or creating new stop on Chestnut Ave for Route 436 that doesn't travel on Western Ave. It would be 220' from Western to clear gas station driveways.

Stop Seq	Stop ID	OUTBOUND STOPS	Route Direction	Distance to next stop (ft)	Revised distance to next stop (ft)	On (FA14)	Off (FA14)	Stop pairs opposite/ close by?	Proposed Recommendation
1	7252	WESTERN AVE @ CHESTNUT ST	OB	885	1,110	28	34		Relocate stop to farside of Tucker = -2 parking spaces. Existing front sign is on pedestrian signal post, although riders appear to wait for the bus between two gas station driveways. Improve safety away from driveways and allow buses turning left onto Chestnut to get into the correct lane further from the intersection. Eliminate previous stop at Rockingham (nearest crosswalk is 400'+ away at Chestnut or Linden, improve spacing to relocated Tucker, sidewalk grades pose constructability issues for a LA) - no rear sign for parking restoration.
2	4533	WESTERN AVE @ WEST COLONY RD	OB	448	760	6	20	Y	Retain stop but shift north, farside of driveway next to West Colony Rd to enable both doors to open to level sidewalk (too many driveways nearside of crosswalk). Add rear sign = -2 parking spaces. Add curb ramp at crosswalk.
3	4534	WESTERN AVE @ TRACY AVE	OB	427	-	4	5	Y	Eliminate stop to improve spacing, low ridership, and absence of crosswalk. No rear sign, but farside stop is ~1 parking space long.
4	4535	WESTERN AVE @ CHATHAM ST	OB	656	1,500	15	26	Y	Retain stop but shift slightly south, in front of residential unit, between 2 driveways (verify sufficient sidewalk length for both doors to open to a level sidewalk, not driveway) = -1/2 parking spaces. Formalize driveway apron abutting Ocean City Nails to extend proposed bus stop zone.
5	4536	WESTERN AVE @ LLOYD TERR	OB	760	-	1	6	Y	Eliminate stop to improve spacing, low ridership, absence of crosswalk & & ~200' from its stop pair. No rear sign, but farside stop = ~2 parking spaces long.
6	4537	WESTERN AVE @ WAITT AVE	OB	402	1,600	1	12	Y	Retain stop farside but shift slightly north farside of the driveway. Relocate front sign & add rear sign.
7	4538	WESTERN AVE @ EASTERN AVE	OB	728	-	20	9	Y	Eliminate stop due to proximity to previous stop and pond, and very poor sidewalk conditions between two very active driveways servicing gas station and small strip mall (that includes Dunkin Donuts, 7/11 etc).
8	4539	WESTERN AVE @ VICTORY RD	OB	419	-	0	3	Y	Eliminate stop due to low ridership, proximity to next stop & pond, and elimination of stop pair.
9	4540	WESTERN AVE OPP FAYS AVE	OB	733	760	1	7	Y	Retain stop but shift south closer to crosswalk to enable both doors to open to level sidewalk.
10	4541	WESTERN AVE @ BUCHANAN CIRCLE	OB	1,244	2,000	2	3	Y	Retain stop but shift north away from guardrail. Relocate front sign ~40' north.
11	4543	HIGHLAND AVE @ WYMAN AVE	OB	722	-	0	1	Y	Assume already eliminated. 14543-435 Highland deactivated by MBTA for FA15; 4544 renamed Highland opp Walmart
12	4544	HIGHLAND AVE opp Walmart	OB	821	830	10	28	Y	Temporarily shift stop north of crosswalk to avoid utilty pole obstructing the sidewalk. Long-term. Restore stop south of southern crosswalk with widened sidewalk (existing sidewalk in this area is <8') as part of intersection improvements.
13	14544	HIGHLAND AVE OPP OLDE VILLAGE	OB	510	520	6	14	Y	Retain nearside of crosswalk, raise height of sign, and create LA by removing grass strip, & target removal of brush at back of sidewalk to improve visibility of stop.
14	4545	HIGHLAND AVE @ BARNES RD	OB	653	1,130	2	2	Y	Relocate farside with the addition of a crosswalk on the northern leg and associated sidewalk and intersection improvements.
15	4546	HIGHLAND AVE @ CEDAR RD	OB	605	-	0	0	Y	Eliminate stop due to low ridership, proximity to previous stop, lack of trip generators and absence of crosswalk (closest is at previous stop). Addition of a crosswalk is anticipated to be complicated due to the existing roadway alignment and grade, in addition to the speed limit.
16	14546	331 HIGHLAND AVE	OB	1,042	940	1	4	Y	Retain stop due to presence of abutting medical buildings, and widen sidewalk to provide a LA and remove the pinch point at the utility pole. Coordinate with abutter to provide a safe and designated pedestrian path alongside the driveway to connect to the sidewalk. No bus stop pair exists or is proposed due to the absence of a crosswalk. Addition of a crosswalk is anticipated to be complicated due to the existing roadway alignment and grade, in addition to the speed limit.
17	4547	HIGHLAND AVE @ GREENLEDGE ST	OB	1,486	830	3	46	Y	Temporarily relocate stop to nearside of Greenledge for better existing sidewalk conditions and a more pleasant and safe waiting area, protected by the retaining wall. Add crosswalk across Route 107. Long-term. Eliminate stop due to the establishment of a new stop at Trader's Way - a closer and more central location to rider origins/destinations.
	NEW	HIGHLAND AVE opp MARLBOROUGH RD (@ SHAW'S PLAZA)			770				Create new stop farside of Trader's Way next to Shaw's Plaza, opp Marlborough Rd. Add LA by removing grass strip, and improve sidewalk conditions to the driveway, including removing pinch points at the utility pole. Assume most of the offs at the Greenledge stop will relocate to this stop.
18	14548	HIGHLAND AVE @ HAWTHORNE SQ	OB	1,048	1,000	32	82	Y	Retain stop but shift further south closer to driveway and access to the retail area. Add bench, or shelter.
19	4549	HIGHLAND AVE @ FIRST ST	OB	1,211	1,650	7	7	Y	Retain stop due to presence of abutting Hawthorne Commons apartments & proximity to Food Pantry, and distance to closest stop, but only in conjunction with the addition of a crosswalk, and shift stop south closer to farside of First St to maintain good visibilty of the stop. If a crosswalk is not feasible, stop should probably be eliminated to discourage crossing Route 107.
20	4550	HIGHLAND AVE OPP FREEMAN RD	OB	706	-	0	2	Y	Eliminate stop due to low ridership, absence of crosswalk, poor sidewalk conditions and proximity to previous stop
21	4551	HIGHLAND AVE OPP VALLEY ST	OB	287	620	1	7	Y	Relocate stop south to farside of the pedestrian bridge, opposite the existing Valley St stop, and farside of a proposed crosswalk to improve connections to the pedestrian bridge and stop spacing with the elimination of the Freeman Rd stops.
22	14551	HIGHLAND AVE @ WILSON ST	OB	750	1,100	4	6	Y	Relocate stop to farside of Wilson St (currently in driveway) for the presence of a sidewalk & crosswalk behind the stop, and improve spacing, while maintaining connections to the school. Improve sidewalk at proposed location.
23	14552	HIGHLAND AVE @ ALMEDA ST	OB	490	-	0	2	Y	Eliminate stop due to low ridership, narrow sidewalk, absence of crosswalk and to improve stop spacing.
24	4553	HIGHLAND AVE @ SALEM HOSPITAL	OB	939	900	9	70	Y	Retain stop due to presence of shelter and shortest (although steeper) path to the hospital, and improve sidewalk around the shelter to remove the step. ALT: relocate stop to farside of intersection and crosswalk, in conjuction with the relocation or addition of a shelter and creation of a LA by removing the grass strip.
25	14553	HIGHLAND AVE OPP PROCTOR ST	OB	345	1,260	5	18	Y	Retain stop, farside of the new crosswalk north of Salem Hospital driveway, in association with sidewalk and other signalized intersection improvements.
26	4554	HIGHLAND AVE OPP 30 HIGHLAND AVE	OB	676	-	1	7	N	Eliminate stop due to low ridership and improve stop spacing.
27	4555	ESSEX ST @ WARREN ST	OB		-	1	32	Y	Relocate stop to farside of Warren, farside of the crosswalk and to better sidewalk conditions = -2/3 parking spaces (signage indicates parking for doctors office). If on-street parking is for 421 Essex St, it has its own small lot. Warren St is resident parking.

APPENDIX H

Traffic Growth Estimates

MEMORANDUM

DATE: **July 29, 2015**
TO: **Michael Clark, MassDOT Office of Transportation Planning**
FROM: **Chen-Yuan Wang, Central Transportation Planning Staff**
RE: **Route 107 Corridor Traffic Growth Estimates**

This memorandum summarizes the analyses and estimates of the background traffic growth from 2015 to 2035 for the Route 107 corridor from Chestnut Street in Lynn to Essex Street in Salem.

The estimates were based on reviews and analyses of the Boston Region MPO base-year and future-year travel demand models recently prepared for the Long-Range Transportation Plan. In addition to the Route 107 corridor, major reviewed corridors in the North Shore region include Route 1A, Route 129, Route 114, and Lynn Street/Washington Street in Peabody.

Table 1 summarizes the estimated traffic growth rates along three different sections of the study corridor and on average for the entire corridor. The three sections are:

1. Western Avenue from Chestnut Street to the Lynn/Salem border
2. Highland Avenue from the Lynn/Salem border to the west of Willson Street
3. Highland Avenue from Willson Street to Essex Street

TABLE 1 Corridor Traffic Growth Estimates

Route 107 Corridor Sections	AM Peak Period		PM Peak Period		Weekday Daily	
	Annual Rate	2015-35 Total	Annual Rate	2015-35 Total	Annual Rate	2015-35 Total
1. Western Ave in Lynn	0.10%	2.0%	0.10%	2.0%	0.05%	1.0%
2. Highland Ave (west section)	0.10%	2.0%	0.15%	3.0%	0.10%	2.0%
3. Highland Ave (east section)	0.30%	6.0%	0.25%	5.0%	0.30%	6.0%
Corridor Average	0.15%	3.0%	0.15%	3.0%	0.15%	3.0%

The estimates were based on the calibrated base-year and the projected future-year traffic volumes on Route 107 in both directions, with emphasis on the peak direction. In traffic operational analyses, these rates can be applied to both the peak and off-peak directions. The model AM peak period is from 6:00 to 9:00 and the PM peak period is from 3:00 to 6:00.

The study corridor overall was estimated to have an annual growth rate of 0.15% and a 20-year growth rate of 3%. It is lower than adjacent travel corridors in the North Shore region, such Route 1A, Route 114, and Lynn Street/Washington Street in Peabody, which were all projected to have a growth rate of 5% to 10% in 2035. One of the main factors for this relative low growth is that the Western Avenue section of the corridor is currently thickly settled and has little room for future capacity improvements. Meanwhile, for the entire MPO region, the transit mode share is projected to increase from 7.2% (base-year) to 7.7% (future-year) and the non-motorized mode from 15.8% to 16.4%.

The study identified a number of developments in or near the corridor. These include the North Shore Medical Center expansion, a new cinema on Highland Avenue, a new transfer station on Swampscott Road, and residential developments near the corridor. A quick review of the population and employment projections for the corridor's adjacent traffic analysis zones suggested that these developments were mostly covered in the future year model, except the new cinema. Also note that the development on Bridge Street and Boston Street (Gateway Center) was defined mainly as commercial use (140,000+ square feet) with the future Salem Senior Center (20,000 square feet).

Table 2 summarizes the estimated growth rates at nine major intersections in the corridor. The estimates were based on the projected total entry volume at each of the intersections.

TABLE 2 Intersection Traffic Growth Estimates

Route 107 Corridor Intersections	AM Peak Period		PM Peak Period	
	Annual Rate	2015-35 Total	Annual Rate	2015-35 Total
1. Western Ave @ Chestnut St (Lynn)	0.10%	2.0%	0.15%	3.0%
2. Western Ave @ Waitt St/President St (Lynn)	0.10%	2.0%	0.15%	3.0%
3. Western Ave @ Fays Ave (Lynn)	0.10%	2.0%	0.15%	3.0%
4. Highland Ave @ Olde Village Dr (Salem)	0.10%	2.0%	0.15%	3.0%
5. Highland Ave @ Swampscott Rd (Salem)	0.10%	2.0%	0.15%	3.0%
6. Highland Ave @ Hawthorne Sq. Mall (Salem)	0.10%	2.0%	0.20%	4.0%
7. Highland Ave @ Willson St (Salem)	0.15%	3.0%	0.20%	4.0%
8. Highland Ave @ North Shore Medical (Salem)	0.20%	4.0%	0.25%	5.0%
9. Highland Ave/Boston St @ Essex St (Salem)	0.25%	5.0%	0.25%	5.0%

Note that these estimates represent average growth rates in the peak periods (6:00–9:00AM and 3:00–6:00PM).

CW/cw